

THE IRON AGE

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Safety First at the Midvale Steel Works

Novel Ambulances, Power-Hospital, Complete Safety

THE "Safety First" movement has become so general in the past few years that a description of the work undertaken by any one organization along these lines, whether it be that of a steel plant or some other industrial concern resolves itself largely into a task of pointing out in what respect one possesses certain special features that another does not. The general essentials are very similar in each organization, certain principles and forms having become recognized as the best.

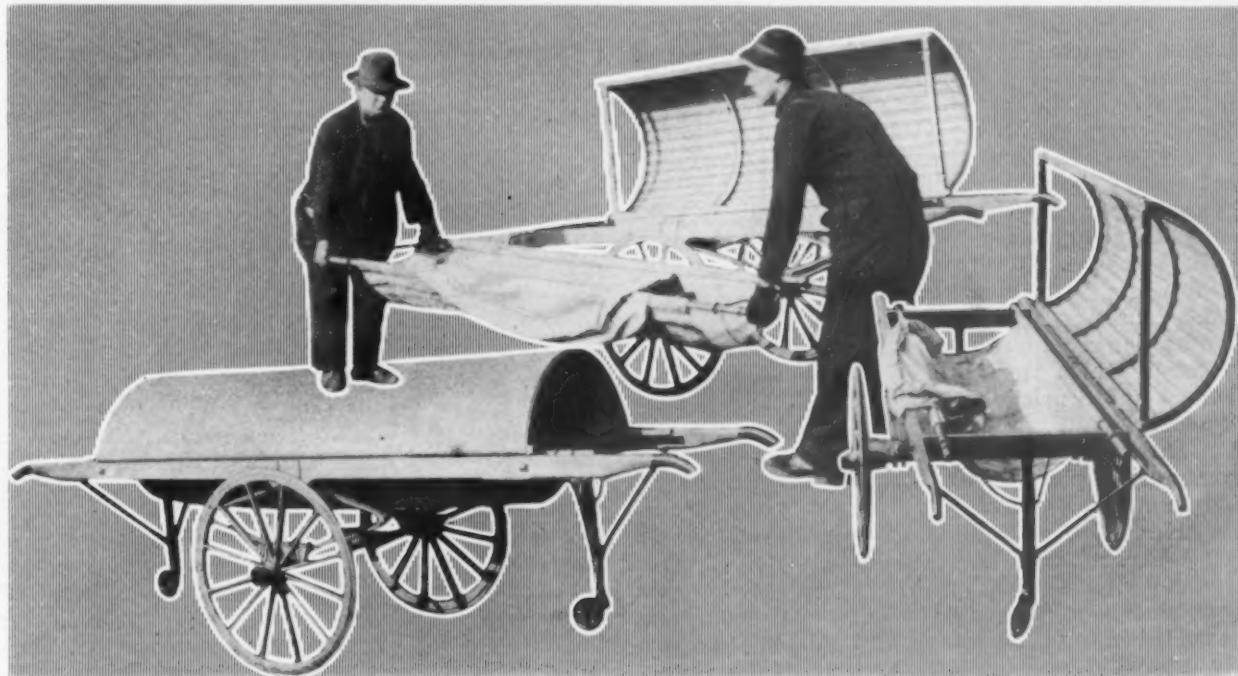
The impression gathered from an inspection of the provisions of the Midvale Steel Company, Philadelphia, Pa., for accident prevention and insurance is characterized by two distinct features. First, the system that has been developed is flexible and complete in every respect. Second there stand out several appliances which are novel and efficacious. It is unusual to find so simple a means for transporting the injured as that offered by the unique ambulances located in various parts of the plant. There is of course the regulation hospital or dispensary with all of its necessary equipment, but at



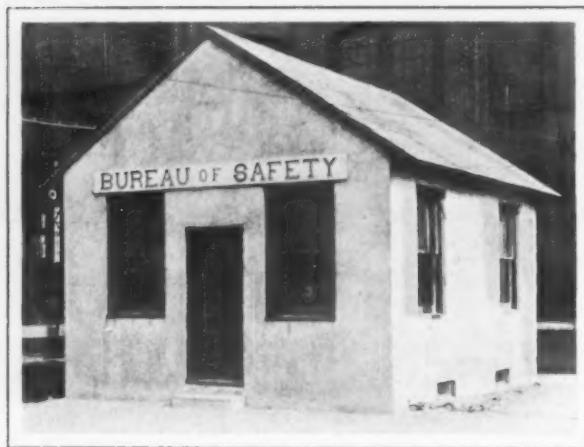
ful Magnet for Works Ladders Among Features

this plant there is a distinguishing feature in the powerful magnet for removing chips and splinters from the eye. Besides these features, described more fully further on, the system for safety which has been developed, is simple and yet so thorough as to embrace almost every possible contingency.

The governing factor in the system there is the Bureau of Safety at the head of which is W. E. Firth as safety engineer. To him is entrusted its management, oversight and responsibility. To him comes reports of all accidents, and also all recommendations for the improvement of the bureau. This department is housed in a small building of its own shown in an accompanying illustration which is the headquarters of Mr. Firth and his corps of four assistants. The extensive plant is divided into 17 sections for carrying out the safety program. In each one of these sections there is a safety committee made up of a foreman and two employees selected by the bureau from a recommended list and serving two months. These committees are changed every two months. The principle is recognized that



The Novel Ambulance in Use at Midvale for Transporting Injured Employees. They Are Protected in Bad Weather by the Cover and Are Comfortably Lifted from It to a Bed



Building for the Headquarters of Midvale's Bureau of Safety

the success of such a movement depends on the co-operation of the foremen. Unless they are effectively interested satisfactory results are impossible. The experience of this company in this respect bears out that of others, for, previous to the present system, a committee composed of the workmen only, was delegated to examine the whole plant once a week, which became in time a very perfunctory operation. Furthermore the sympathy and interest of the foremen were not secured. The plan of having foremen on these committees so as to bring them into active and loyal co-operation is further strengthened by a scheme of pecuniary reward. The committee of each section is awarded a prize or bonus of \$30 if, at the end of its period of two months, its percentage of accidents is below the average established for all previous periods in that division. An additional prize of \$30 is awarded to the section which makes the greatest reduction in its accident record. Thus it is possible for one committee of three men to secure \$60 for one period of two months and for the other 16 committees to secure \$30 each for the same period. The incentive to loyal and efficient work is greatly strengthened by this plan and competition between sections secured.

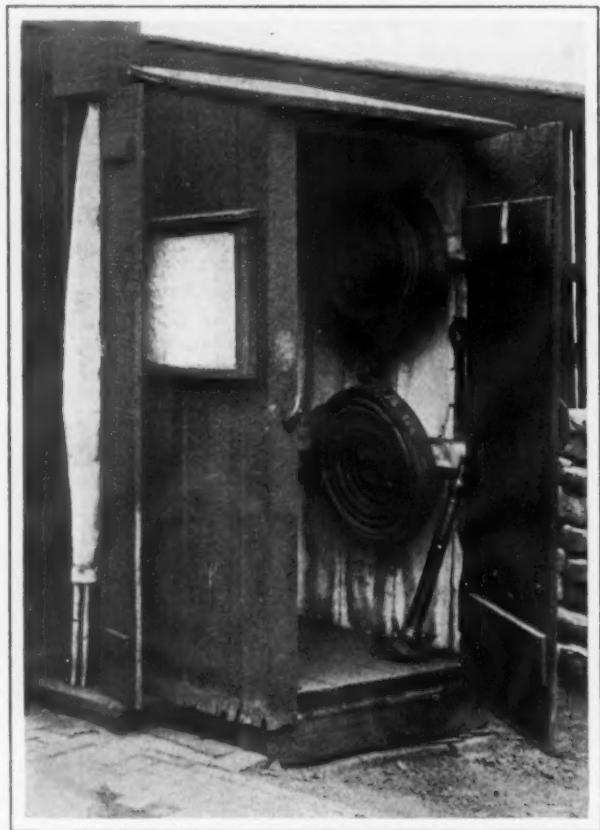
The general duties of these sectional committees are to make recommendations to the Bureau of Safety for improvements of any kind that tend to prevent accidents and especially to be ever watchful to report or correct men doing dangerous, foolish or stupid things. All recommendations are passed upon by the head of the bureau. Frequent meetings of any or all the committees are held at the call of Mr. Firth in the headquarters of the bureau to discuss these recommendations or other matters of vital interest to the general welfare of the organization. The number of suggestions that are made is large and the results exceedingly satisfactory. Suggestion boxes are placed conveniently about the plant for the use of any man. In this way hardly any possible cause for injury is overlooked. To give force to the plan certain rules are prescribed the infringement of which is reported to the committees and others and penalties in the shape of fines are exacted.

There are 31 different stations, located in various parts of the plant, in which are kept stretchers and any material necessary for first aid in the case of injuries. One of these stations is illustrated. In most departments there are three shifts of eight hours each and in each of the 17 sections four men per shift are designated who are frequently instructed in the principles of first aid. When a man is injured it is their duty to attend to his urgent needs before he is sent to the doctor.

In the case of severe injuries the company has

provided, in a few convenient places in the plant, a novel ambulance by means of which the injured man can be easily and comfortably transported to the dispensary or hospital. Three views are shown in the group illustration. The light frame work is carried on bicycle wheels and it is provided with a frame cover for protection in bad weather. The stretcher is placed in grooves in the frame work of this ambulance and the patient comfortably transported to any desired place. Nor does he have to be removed from it to be placed on a bed or in a hospital. This ambulance was designed and built by an employee of the company.

The facilities for treating and caring for the injured are exceedingly complete. After the first aid treatment the patient is taken to the "dispensary" which is in reality a small hospital built adjoining the time-keeper's office, at which a doctor is con-



One of the 31 Safety and Fire Stations Located in Various Parts of the Plant

stantly on duty day and night. It has as its chief, Dr. R. P. Cummins, who usually spends two to three hours at the plant every afternoon. Assisting him are other doctors, one of whom is on duty every hour of the week. Incidentally every man who is acceptable as a possible new employee must undergo a physical examination by the doctors of the company. Special private rooms are provided for this purpose and no man is allowed to go to work who is not pronounced fit.

Every facility is here provided for treating and caring for nearly all possible cases. Shower arrangements for treating heat prostrations, X-ray apparatus, and all the usual appliances are conveniently at hand. As stated earlier the electro-magnet is a feature of this department. It was designed by members of the company and is shown in one of the illustrations. It has already done wonderful work in drawing out pieces of steel imbedded in the eyes or flesh, in many cases preventing the loss of an eye or other serious consequences. This magnet

takes 2.4 amperes at 110 volts, that is, 264 watts, and can easily lift 18 lb.

A complete card index system is employed for keeping a record of each patient, the complete history of his case being recorded and tagged with colored labels so as to tell at a glance his present condition. A patient who needs extended hospital treatment is taken to the Germantown hospital, Philadelphia, where the necessary attention is provided at the expense of the company.

The system of keeping track of accidents and investigating them is notably complete. Every accident, no matter how trivial, is reported on a prepared blank to the Bureau of Safety by the foreman. This report is placed in the hands of an inspector who investigates the circumstances attending the accident. His conclusions are embodied on another printed blank and, if approved by the safety engineer, it constitutes an official record. In the case of the more serious accidents, a sketch of portions of the body is attached showing what bone is broken or what artery is cut, etc. The inspection of all cranes, ladles and other apparatus are duly reported to this bureau on prepared forms. Any repair work that is being done is also made known to this department so that possible pitfalls of danger may be watched. The bureau has a corps of special officers whose duty it is to act as watchmen, to report infringement of the safety rules and similar duties. Every new employee is carefully instructed in the use of apparatus he is to work with and a report to this effect is on file in the safety department.

A careful tabulation of all accidents and a classification is also made by the force of the Bureau of Safety. This is very complete and embraces nearly every possible general contingency. From these a more condensed classification is formulated as follows:

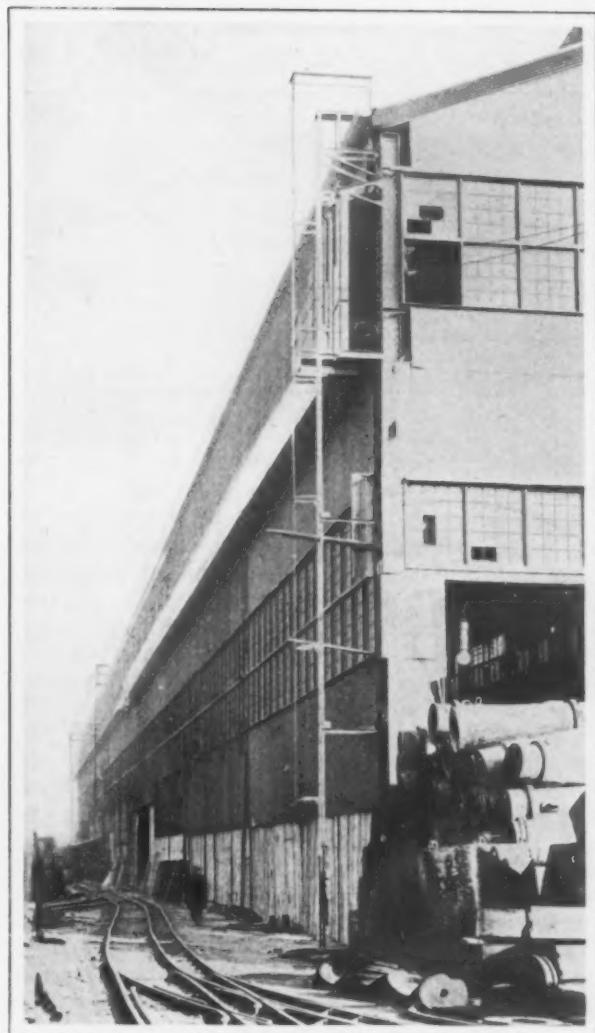
Class 1—Occupational, incidental and non-preventable hazards.

Class 2—Accidents due to the negligence of the company.

Class 3—Failure to use proper tools, appliances, etc.; violation of rules—preventable hazards.

Class 4—All of class 3 and any act resulting in an accident to a man through the negligence, fooling, scuffling, etc., of a fellow-workman.

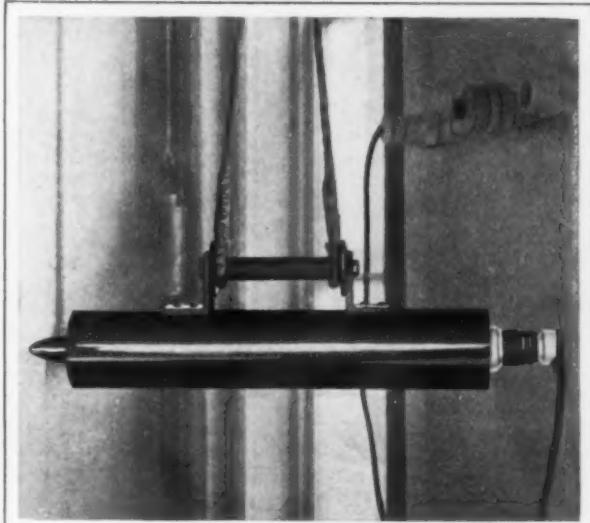
Experience has shown that an average of about 74 per cent. of all the accidents are preventable, embraced by classes 3 and 4 and that about 6 per cent. are of class 1 or non-preventable, and about 2 per cent. blameable on the company. These data are based on the experience of 3 years under the



The Safety Ladder on An Open-Hearth Building at Midvale

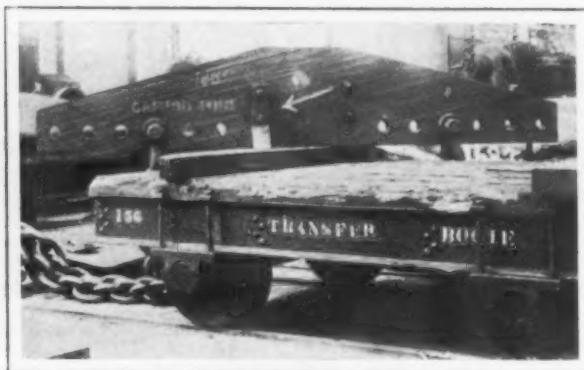
committee system in which the foreman then had no part. This large percentage of preventable accidents will probably be reduced under the new system in which each foreman is an interested party in the success of the scheme. The company has tried to bring out in the new plan the great opportunity in preventing accidents by thought and care, in pointing out possible hazards to careless men and generally getting the individual to think and not depend entirely on all dangerous conditions being safeguarded.

However, the arrangements for safeguarding workmen and preventing accidents are thorough and up-to-date. New suggestions are speedily acted upon so that the system is expansive. Particular attention should be called to the safety ladders which are attached to certain buildings and shown in one of the illustrations. These are especially useful in the open-hearth buildings, affording a means of easy escape in case of accidents due to the spilling of molten metal or trouble in the furnaces. These ladders lead down from a gallery running the whole length of the building on the outside—placed as a possible refuge in case of accident. The ladder is constructed like an ordinary steel ladder except that at the back of it or at the back of the ascending or descending employee there is a piece of flat bar steel extending the length of the ladder to nearly the ground. It is supported and joined to the main ladder by rings of steel of a diameter sufficient to allow a man's body to pass through and located at intervals that have been found most efficient in practice. The vertical bar serves to hold a man for an interval long enough for



The Powerful Electro Magnet in Midvale's Dispensary for Removing Steel Imbedded in the Eye or Flesh

him to recover his hold should he lose it, while the hoops or rings supporting the bar serve also to arrest a man in falling from the ladder proper.



Safety Beam for Handling Heavy Plate

One of the illustrations shows this ladder as it appears installed on one of the open-hearth buildings.

A beam for handling heavy plate up to 100 tons has prevented many accidents since its use and is very effective. It is also illustrated here. A foot piece is placed on each side so that it will not fall after removing the crane clevis.

The insurance features of the Midvale system are entirely adequate to care for all kinds of recompense. Each employee contributes 5 cents per week to a general fund. To this are added all fines and dockes for the infringement of rules or for any other cause, these being deducted from the regular wages and sent into the beneficial fund, a fund entirely apart from the company's funds. All loss of time caused by accidents is compensated for from this fund. For death resulting directly from accidents the provisions are that a sum equal to 50c. per man employed in the works be paid to the deceased's beneficiary. This is paid from the beneficial fund.

In the case of death of an employee from natural causes whose services have been consecutively at Midvale for 3 years his beneficiary receives a sum equal to 10c. per man from all men employed at that time. For 5 years' service an additional \$250 is paid.

The campaign at Midvale was started in 1907 and its development has been gradual. While the results thus far have been beneficial to both the employees and the company, greater results still are looked for. Every occasion is taken to aid the men not only while working but when they are too old, there being numerous instances where such cases are either pensioned by employing them in some less arduous capacity or by really providing for them in other ways. The safety movement as elsewhere is here serving to bring employer and employee close together. The latter is being made aware of the fact that the former is interested in him and increasing loyalty and greater efficiency all around have been noted at the Midvale works.

The Moltrup Steel Products Company, Beaver Falls, Pa., has been organized with the following officers: J. T. Moltrup, president; M. P. Simpson, vice-president; Stephen Moltrup, treasurer; F. H. Guppy, secretary. The company is incorporated with a capital stock of \$50,000. The products are cold-drawn steel bars, in flat, square and special shapes, finished machine keys and other ground and milled specialties. The company has purchased the plant of Emerson, Smith & Co., Beaver Falls, and will continue the manufacture of Emerson saws, both circulars and bands and hammered, ground and polished plates and discs. All of the incorporators were formerly connected with the Standard Gauge Steel Company, Beaver Falls.

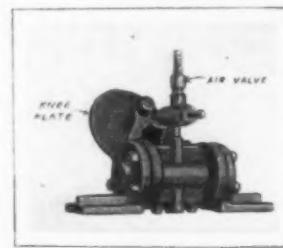
Molders' Bench with Pneumatic Vibrator

The Western Tool & Mfg. Company, Springfield, Ohio, has placed on the market a molders' bench that is fitted with the company's new pneumatic rapper or vibrator. The special features of the bench are a somewhat novel design, absence of places where waste sand might lodge and freedom from any obstructions for the workman's shovel. The special feature of the vibrator is an adjustable valve that can be changed for light or heavy work and easy manipulation of the air valve.

As will be noted, the bench has a bow frame made of 1½-in. wrought-iron pipe, with braces of a smaller size of the same material. This construction is to afford strength, minimize weight and eliminate crevices to afford lodgment for waste sand. The frame is rigid and the skids are rated to carry 1000 lb., and the side shelves 200 lb. each. Different lengths of support are furnished, but the standard bench is fitted with skids 30 in. from the floor. The brackets are adjustable and provide a convenient place for setting the cope or match plate. The tool shelf can be adjusted to any designed height. The side shelves, which are of sheet metal, are interchangeable, one being 3 ft. long and the other 1 ft. shorter.

The clear space between the wheels of the bench is 4 ft., so that the machine can pass over the pile of sand in a foundry.

The pneumatic rapper, which is fitted to the bench, is one of the most recent products of the company. It has an adjustable valve that can be readily changed to accommodate either light or heavy work, and one of its principal features is the arrangement for the easy manipulation of the air valves by the operator, the control being accomplished by a knee plate. The vibrator is



The Pneumatic Rapper or Vibrator Employed in Connection with the Bench

or heavy work, and one of its principal features is the arrangement for the easy manipulation of the air valves by the operator, the control being accomplished by a knee plate. The vibrator is



A Somewhat Novel Type of Molders' Bench Having a Wrought-Iron Pipe Frame

made with double inlets and ports, which is relied upon to insure positive action. Four sizes of vibrator are made for use either with or without the bench.

GERMAN LAP-WELDED PIPE

The Modern Machinery Used and Some Details of Manufacture

Many interesting details of modern German practice in making lap-welded pipes and tubes are given in an article by Dr. O. R. Eisner in *Stahl und Eisen* for January 15, 1914. The keen competition of plants making butt-welded and seamless tubes has caused the use of modern machinery and methods. The sizes made are from 3 in. to 16 in. internal diameter. Anything below this size is given to the seamless tube plants, and pipe above 16 in. is very rarely called for, their production also leading to mill difficulties.

The material used is a soft, weldable steel. Experience has determined certain limits of composition. With carbon not over 0.12 per cent. the manganese should not be lower than 0.40 per cent., nor should it go higher than 0.55 per cent., because high manganese usually means higher carbon. Silicon should only be present in traces, but on the other hand, the phosphorus may be fairly high as it has a favorable influence on working and welding. It should not be so high as to cause dangerous cold shortness. The sulphur should not be above 0.05 per cent. for ordinary work, though it may be increased with care in thicker steel. Copper from 0.10 to 0.15 per cent. is not harmful of itself, but as it probably forms very harmful sulphur compounds it should be kept below 0.10 per cent.

The first operation is to heat the skelp to a suitable temperature for rounding. The furnace is gas fired, and regeneration used, both gas and air being pre-heated. This is also the case with the welding furnace. The temperature in this first furnace need not be high, the steel being usually heated to just about a yellow heat. This takes only about 15 minutes, depending on the thickness of the skelp or plate. Before the steel is rounded, the edges must be thinned out to give the proper overlapping. This was formerly done cold, but is now carried out in a special mill shown in Fig. 1, which gives a greatly increased output. The upper of the two rolls can be moved lengthways over the other, so as to take different width pieces, and prevent frequent changing. The proper width of the steel must be carefully maintained, otherwise the edges will be too long or too short, both of which will cause bad finished pipe.

The prepared pieces go directly from the mill to the rounding funnel, one of which is shown in Fig. 2. It is of cast iron gradually changing from the funnel shape at the front to round at the back. The piece is gripped by tongs attached to an endless chain, and slowly drawn through the funnel. This funnel is in two parts so that it can be narrowed or widened, and take different sized pieces. If the

overlapping at the ends is not quite complete, it is remedied by a workman with a hammer.

The rounded pieces roll down skids to the welding furnace, where they are repeatedly turned and raised uniformly to a welding heat. In the middle of the hearth a channel is left, and when the piece is at the proper temperature it is brought to the middle with the overlapped edges resting downwards in the depression. The door is opened, it is

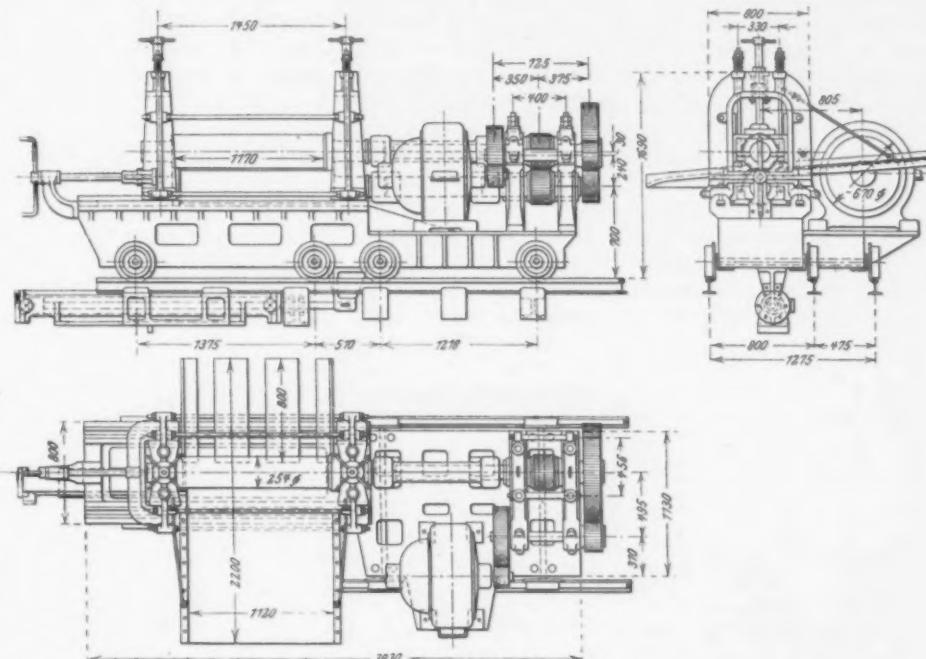


Fig. 1—Mill for Rolling Out Edges

withdrawn, and taken to the mill, which is two-high, non-reversible. There is only one size pass so that the rolls have to be changed for each size tube or pipe that is made. The mandrel is of cast iron, or better of cast steel. Two or three passes are given, and a decrease in the thickness of the walls of the pipe is brought about by using a larger mandrel. The roll passes remain the same.

The piece is either returned to the furnace for further heating or else goes direct to the cooling beds. From here it goes to a reversible two-high

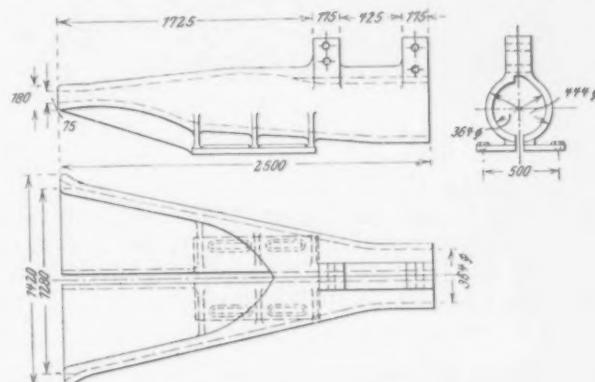


Fig. 2—Rounding Funnel

mill, where the section is made perfectly round, it passes slightly larger than the pipe, then through the straightening rolls, and is finally finished by bending, welding on bands, etc. G. B. W.

G. B. W.

The American Iron and Steel Institute now has 1185 members, of whom 1102 are active, 69 associate and 14 honorary. A complete list of the membership is in press and will soon be distributed.

Brazil as a Buyer from the United States

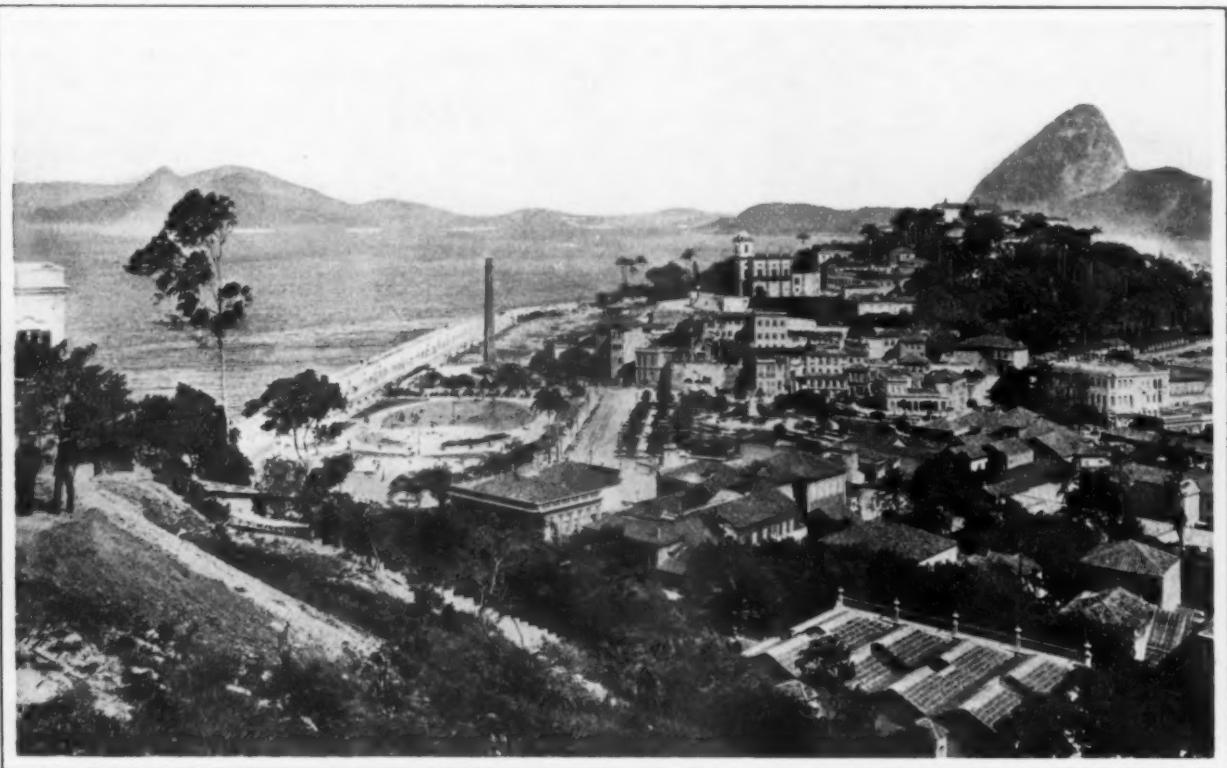
Abundant Iron Ore But a Steel Industry not Likely
—Some Tariff Concessions to This Country, But
Brazil Sends Us Three Times Our Shipments

BY CHARLES M. PEPPER

RIO DE JANEIRO, BRAZIL, March 14, 1914.—Brazil's bigness geographically is not yet reflected in census figures. With an area larger than the continental part of the United States the population is still confined largely to the coast region. There are no trustworthy statistics of population. Estimates vary from 17,000,000 to 24,000,000 inhabitants. Probably the actual number is midway between these guesses. Brazil as a market, however, does not require guessing. It is a big factor in the world's trade, the foreign commerce reaching \$650,000,000 to \$700,000,000 annually. The total

ordinary years. In spite of low prices the production has mounted until it is now in the neighborhood of 40,000 tons annually.

I have outlined some of these leading export products of Brazil because they furnish a measure of its value as a world market and they indicate the sources of the purchasing power. With so rich and varied agricultural products for export the sequence is that Brazil furnishes a most inviting field for manufactured commodities. The only question is whether the market will always continue so valuable or whether the country by the development



A Glimpse of Picturesque Rio de Janeiro, Looking Across the Harbor

varies considerably from year to year because of the marked variations in the prices obtained for coffee and rubber. These two products constitute from 80 to 85 per cent. of the total exports of the country.

WEALTH GAINED FROM THE SOIL

Cacao or chocolate beans furnishes an important product but the total value is small as compared with coffee, say \$7,000,000, as against \$200,000,000 in average years. It is rather interesting to know that the tea plant known as yerba mate totals above \$10,000,000, which is about the figure for hides. The yerba mate goes to the neighboring countries of Argentina and Uruguay, while the hides are taken by the United States and Europe.

Rubber, which is in the dumps at present on account of the competition of the cultivated rubber of the Malay Straits Settlement, may be counted on to bring in from \$75,000,000 to \$100,000,000 in

of natural resources will be able to supply its own wants through the growth of domestic industries. My own opinion is that Brazil always will be a large buyer of manufactured commodities and in particular of iron and steel products. This does not mean that the country has not an industrial future, for it has a promising one.

LACK OF COAL THE GREAT DRAWBACK

When it comes to the natural resources other than agricultural products the one great lack is coal which can be exploited as a commercial proposition. There are some coal deposits in Santa Catharina and one or two other states. But these hardly more than serve for local purposes. Besides, Brazil is so large that coal deposits in one section might have little commercial utility for the country as a whole on account of the cost of transportation.

The comprehensive study made for the Brazilian government a few years ago by Professor

White, the American geologist, while presenting much useful information and scientific data, did not hold out the promise of coal as an industrial factor in the growth of the country. This opinion evidently is held by Brazilian officials, for after the extent of the iron ore deposits in Minas Geraes and Goyaz was fully verified and the national policy was developed of establishing a national iron and steel industry the economic problem which it was sought to solve related to the cost of the overseas transportation of coal to meet the iron ore on the coast, and the cost of transporting the iron ore down to the coast. Limestone was accessible, but the general problem is still unsolved.

Both the federal and the state governments are ready to aid in the development of native iron and steel industries. Reduced freight rates on the government railroad lines and on the private lines through the co-operation of the government is one essential. Another essential is reduced freight rates on coal from Europe and the United States. That is a matter for the steamship companies and

problem which lies at the basis of Brazil's richest iron ore deposits. The nearest port is at Victoria in the State of Espiritu Santo about 100 miles north of Rio Janeiro. The Brazilians who had the concession for the extension of the railroad lines which tap the ore fields at last reports were hopeful of getting the modifications which would insure the construction of the necessary links in the railroad system. It may be recalled that the Baring group of London bankers were ready to finance these railroads under certain conditions, but the negotiations were temporarily abandoned because the bankers' requirements were not complied with. James J. Hill was reported to be ready to interest himself with the Barings.

The latest advices are that the transportation difficulties will be solved in so far as relates to the Brazilian government and the railroads. Then comes the economic question whether it will pay to export Brazilian ores to the United States and Europe. The intimation is that the margin of possible profit has been reduced to a very few cents a



Aerial Railroad to the Summit of Sugar Loaf Mountain

over these the Brazilian government exercises no control.

Cash subsidies for steel rails of native production are also suggested as a means of developing the industry. This would be in line with the government policy, but even then the time seems far distant when Brazil will be making steel rails, though Brazilian ore may enter into rails made in Europe and the United States for the Brazilian railroads.

IRON ORE FOR EXPORT

The tendency now apparently is to exploit the iron ore deposits with a view to the exportation of the ores. No question exists about the value of these ore deposits from the magnetic ore of San Paulo to the hematites of Minas Geraes and Goyaz. One calculation is that there are 12,000,000,000 tons in central Minas.

Transportation of ore 400 to 500 miles by railroad is an expensive proposition, and that is the

ton and that some of the capitalists are doubtful whether the attempt should be made for some years at least. It would not be a bad guess that among the various syndicates or groups which have secured options on the Brazilian ore fields Americans are included.

EXPORTS OF MANGANESE ORES

Manganese ore for export is a much simpler proposition than iron ore. The exports of manganese ore in recent years have ranged from 150,000 to 175,000 tons per annum. The official statistics place the value of 174,000 tons exported in 1911 at \$1,254,000 and of the 155,000 tons exported in 1912 at \$1,115,000. That may be somewhere near the real value or it may not. The United States is the best customer for these manganese ores, in some years taking half the total production. Great Britain comes next and then Belgium, with Germany fourth.

The manganese ore fields from which shipments

are now made are located at Miguel Burnier and at Quelaz something like 300 miles from the seaport. At Bernier there is limestone and at Quelaz a granite gangue. These deposits are comparatively free from sulphur and phosphorus. At Quelaz there is claimed to be a reserve of 5,000,000 tons.

Other manganese deposits occur at widely separated points in the States of Bahia and Pernambuco in the north and at Urcum in the south of Matto Grosso. Urcum is located about 20 miles from Corumba on the Paraguay River and the output of these mines might find its way to market by water carriers, that is river boats, down to Buenos Ayres but the project would hardly be an inviting one. American interests are understood to have allowed an option on some of the Urcum deposits to lapse because the ore was found to have too much sulphur.

The fact about the Brazilian source of manganese ore supply is that the fields which are already worked can supply the demand for an indefinite period and could also supply a largely augmented demand if the prices were satisfactory. There is a suspicion that some of the people interested in the manganese ore fields do not care to have too much of the ore thrown on the market.

An American mining engineer who was up in the district not long ago told me of the primitive way in which the mining was done with pick and shovel when vast quantities of the ore were exposed and could easily be handled with steam shovels. The government owns and operates the Central Railway, which is the only means of transportation to the seaboard. Formerly there was complaint that insufficient dock facilities were provided at Rio and on that account only limited quantities of manganese could be handled. Now the dock facilities are ample and the question would seem to be the freight rate over the government railroad.

HYDROELECTRIC PROJECTS

Brazil in addition to its iron ore deposits has one natural resource which may encourage the development of industries by means of hydroelectric power. This is the water courses. The light and power company of Rio de Janeiro which furnishes the power for the tramways and for lighting gets its power from Lages, some 50 miles from Rio. The same company operates its plant at San Paulo from the falls of the river Tiete and from Sorocaba which furnish sufficient power for much of the industrial development that is making San Paulo a manufacturing center. These light and power companies, which are among the most important in Brazil, are American projects. They were among the earliest of enterprises of this character in foreign countries which Dr. F. S. Pearson inaugurated so successfully.

HOW INDUSTRY HAS DEVELOPED

The industrial development of Brazil has been continuous with an occasional setback due to overconfidence and frequently to lack of experience. The speculative element also has entered into it and to an observer from abroad there seems to have been too much reliance on aid from the federal and state governments. Nevertheless its progress has been not unlike that of Canada, though along different lines, for the textile industry is the one that under a very high protective tariff has developed most rapidly. Brazilian production of cotton fully justifies the establishment of native cotton factories.

Some native industries may be developed which will decrease the dependence on foreign industries.

Yet the installation of all these industrial plants can only go forward through machinery purchased in Europe and the United States and the installation and replenishment of factory plants in Brazil promises in the general balance of commerce fully to compensate for any loss that may be sustained through the development of domestic industries. That is why the general conclusion is reached that Brazil will present an increasing rather than a decreasing market for iron and steel products. The subject is so large that it has to be condensed into a specific statement of this kind or else described in detail for which there is no room in this letter.

BRAZIL A DEBTOR COUNTRY

The status of Brazilian trade, industry, and finances has to be known in order to appreciate the commercial possibilities of the country while at the same time allowing for temporary depression. Brazil is a debtor country. It has a depreciated paper currency. Its finances are considerably demoralized. It spends more than it takes in.

This may be said to be the dark side of the picture. Also there is a brighter side. Brazil has gone in debt chiefly for the purpose of public improvements, national, state, and municipal. Some of these debts were improvidently contracted. Some of the national, state and municipal improvements have been carried forward with prodigality. But while Brazil is at times pinched for money the interest on the foreign loans is met and the credit of the country is maintained. That is the chief thing.

How beneficial the national improvements have been can only be appreciated when something is known of them in detail. For a country which has vast quantities of natural products to export and which is a heavy importer of merchandise harbor facilities are the prime essential. Brazil has provided them during the last ten or twelve years. The shipping which enters the splendid bay of Rio now comes right up to the quays.

Santos, the greatest coffee port of the world, also has its splendid system of quays. Rio Grande do Sul, which is the prospective entrepot of commerce for the southern part of the country, is completing a jetty system which gives every promise of success. Para at the mouth of the Amazon has improved its port facilities so that they will serve the needs of the Amazon commerce for many years to come. Bahia, the northern entrepot of trade is completing its port works and even Pernambuco with its rough waters is going to have a fairly good harbor.

Foreign shipping, by means of dock dues and other charges, helps pay for these improvements, yet the most of the expense falls upon Brazil and these port improvements which include sanitation on the most approved modern methods are one reason why the country is so heavy a borrower and why old loans frequently have to be paid with new loans.

Colonel Roosevelt when he was in Brazil a few months ago was so impressed with what he saw that he indorsed the idea of the country going deeper into debt and even sermonized a little on the duty of incurring debts for public improvements. I think myself that Brazil will do well to halt for a while and let the country grow up to the improvements already made; but this does not mean any lack of confidence in the ability of Brazil to find its way out of the present financial demoralization, which is due partly to the fall in the price of rubber and similar economic causes and partly to national improvidence and extravagance.

RIO DE JANEIRO REMADE BY IMPROVEMENTS

Civic improvements in all the leading cities of Brazil have gone forward at the same pace as port works and similar public improvements. Rio de Janeiro in ten years has been remade. The city itself is wonderfully picturesque with the island-dotted bay and the green mountains in the background. It used to be that the picturesqueness was all that Rio could boast of in the way of attractions. Now it is both picturesque and habitable. The population is somewhere in the neighborhood of 900,000. Since the improvements have been made I should say that Rio de Janeiro is the most attractive of the great tropical cities in the world.

The civic improvements were begun ten years ago by the opening of a wide avenue from the water front through the heart of the city. A narrow street was converted into an imposing boulevard. Other broad avenues were also opened up. These improvements have meant the expenditure of large sums of money for building material. The reconstruction is still going on and the market for builders' hardware, some forms of structural steel, and sanitary appliances feels the impulse of this new civic spirit as manifested in modernized buildings.

Santos, which is the greatest coffee port in the world, did even more in the way of port works than Rio de Janeiro. Its system of quays is one of the finest that has ever been constructed to accommodate foreign shipping. Santos, however, is simply the port of the city of San Paulo, 50 miles away from the coast. It hardly can be said that San Paulo has been reconstructed, because it has grown too rapidly for that. It is almost a new city with a population in excess of 400,000.

San Paulo is the industrial hub of central and southern Brazil. It is here that so many cotton factories are located. There are also woolen mills, bagging mills, a great cotton seed oil mill and many minor industries. A \$4,000,000 packing house plant which one of the American companies is putting up indicates confidence in the future of the meat packing industry in Brazil.

Manufacturers in the United States readily will see what the installation of these manufacturing plants means in the way of a market for iron and steel and similar products.

FUTURE RAILROAD BUILDING

Railroad construction for the next year or two is not likely to be rapid owing to the condition of the world's money market, but it will not be suspended entirely. There are now more than 14,000 miles in operation, some of them government lines and some owned by the private companies in which are invested American and European capital.

The extension of the lines in southern Brazil controlled by the Farquhar syndicate has been the most notable feature of Brazilian railroad development during the last two or three years, and these extensions promise to be equally important in the future; but other syndicates or companies will also do more railroad building, and it is expected that the government will spend considerable money, when the money can be had, in double-tracking sec-

tions of the Central Railway between Rio de Janeiro and San Paulo. The budget for the present year, or rather the deficit for the last year, carries something like \$17,000,000 for the government railroads.

Heavy contracts for furnishing steel rails to the Brazilian lines were obtained by the mills in the United States. Much of the rolling stock and other material is also supplied from the United States. The car and foundry companies which have the heaviest contracts have now established their own shops and assemble the parts at these shops. The tendency towards building the cars at the Brazilian shops is growing.

TRADE WITH THE UNITED STATES

Trade between Brazil and the United States is top-heavy. This is due to the position which the United States occupies as a buyer of coffee and rubber. The normal trade between the two countries in active periods is not far from \$200,000,000 with Brazil sending to the United States something like \$150,000,000 and the United States sending to Brazil possibly \$50,000,000. With the drop in the price of rubber and with coffee getting only a fair price, the Brazilian exports last year did not reach this total, while the United States actually increased its

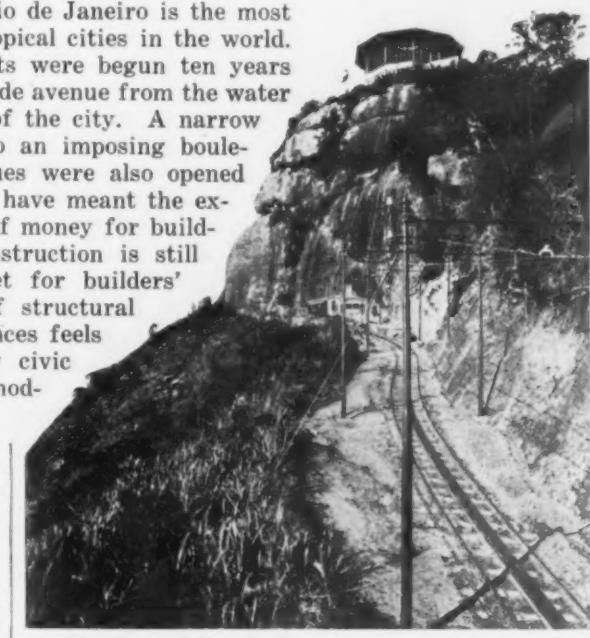
proportion of exports to Brazil. Nevertheless the normal commercial situation is about in the proportion of three to one in favor of Brazil.

Shipments from the United States include food-stuffs as well as what are ordinarily known as manufactured commodities. But the proportion of food-stuffs, with the exception of flour, is not large. Iron and steel manufactures and machinery and tools furnish the best market for Americans. For example, in the year 1912 there were imported through the port of Santos alone these articles to the value of nearly \$5,000,000.

Because American Congressmen are afraid of being charged with taxing the breakfast table, coffee is admitted into the United States free of duty, although Brazil lays an export tax on the product. It is of great importance to Brazil to maintain the continued free admission of coffee into the United States. For that reason years ago the policy was adopted of making minor tariff concessions on a few American products.

TARIFF PREFERENTIALS TO UNITED STATES

Since more than 99 per cent. of Brazilian products were admitted into the United States free of duty Brazil established a list of preferential articles for American products on which a reduction of 20 per cent. from the regular duties was allowed. With the exception of flour these articles were not of great importance and the European countries which are our competitors gave little heed to them. Occasionally the State Department at Washington secured the addition of an article to the list but it never has been an extensive one. It includes cement, refrigerators, typewriters and watches and clocks,



Cog Railroad to the Summit of Corcovado, Overlooking Rio

paints and inks. Within the last year the cement works in Pennsylvania have taken advantage of the preference to enter the Brazilian market.

Three years ago the State Department on the urgent representation of the American flour mills that 20 per cent. was not enough to enable them to retain their market in the Amazon country and northern Brazil, secured an increase of the preference to 30 per cent. The Argentine millers and wheat raisers, through their government, brought diplomatic pressure to bear on Brazil to prevent the increased preference, but their efforts were without success. The reduced duty on flour is actually about the only thing of value that the United States gets from Brazil in return for its very liberal tariff treatment of Brazilian products.

The preferentials are authorized every year in the budget law passed by the Congress and are proclaimed by the executive so that the arrangement is of a most temporary and unsatisfactory character. Brazil is not apt to abandon this preferential policy toward the United States, since there is so little of actual concessions in it, but it does not seem disposed to broaden the scheme.

Occasionally concessions are obtained by administrative rulings of the customs officers. This, however, is a very uncertain prospect. Both British and American oil companies were interested in providing greater facilities for tank storage, but the duty on steel tanks was so high as to be practically prohibitive. It took 18 months to get this condition remedied.

While American manufacturers naturally are anxious to secure preferentials, if these cannot be had they are willing to take their chances with European manufacturers in any reduction of duties that may be obtained. The Brazilian tariff is not only high, probably the highest of any civilized country in the world, but there are numerous surtaxes which add to the burden of the Brazilian consumer and to the annoyances of the foreign exporters. One day in San Paulo a large importer of electrical supplies picked out a sample invoice and noted the extra charges. They amounted to just 50 per cent. in addition to the regular duties. He said that 50 per cent. would be about the average on most of his importations.

A MOVE FOR LOWER DUTIES

Iron and steel products of all classes suffer not only from the unnecessarily high duties, whether these duties are considered from either a protective or a revenue standpoint, but also from unscientific classification. The Brazilian importing houses and the manufacturers' agents and direct representatives are seeking now to obtain not only lower duties but also more sensible customs classifications.

There is a prospect for a revision of the Brazilian tariff, but it cannot be considered more than a prospect. A Congressional commission has been studying the subject and has received a large amount of information from all sources. This commission may be ready to report to the Congress in May.

American manufacturers who feared that the revision would be made before they could have proper representations laid before the Congress need have had no apprehensions. Both the embassy and the consulate general took hold of the matter vigorously and they have co-operated with the Brazilian representatives of the American manufacturers.

Because the tariff commission may report to the Congress in May it must not be supposed that tariff legislation is probable that early. The likelihood is

that when the Congress receives the report it will put the subject over to the November session for discussion and then it may or may not pass a new tariff law by the end of December, when its functions will expire.

THE STEEL CORPORATION'S STEAMSHIP SERVICE

The action of the United States Steel Corporation in establishing a regular steamship service under the American flag is working out very successfully. Aside from the commercial side of the project, the Steel Corporation is entitled to credit for gratifying national sentiment. As an American, I confess that the flag, so rarely seen in foreign ports, looks good to me.

It is of decided benefit to trade in the United States to have the freight facilities augmented. In the nature of things it is not practicable to confine the ship's cargo entirely to steel rails and similar products, and besides coal the steamers are bringing out a good deal of general merchandise, both for Rio de Janeiro and for Santos. Manganese ore furnishes part of the return cargo.

New Ball-Bearing Polishing Lathes

The Gardner Machine Company, Beloit, Wis., has developed a line of motor-driven, ball-bearing polishing lathes, which are built in three sizes. They are equipped with a fully inclosed direct-current motor of the commutating pole type and a special motor starter.



One of a New Line of Motor-Driven Double-Spindle Polishing Lathes Equipped with Ball Bearings Throughout and Having a Special Type of Spindle Construction

The spindle of the largest machine, which is the one illustrated, is 49 in. long. It is of extra heavy construction and is mounted in ball bearings. The largest diameter of the spindle is $2\frac{1}{4}$ in. and between the flanges this dimension is 1 in. less. The complete weight of this size is 850 lb. Two smaller sizes are built with spindles $42\frac{1}{2}$ and 32 in. long, respectively, and diameters between the flanges of 1 and $\frac{3}{4}$ in. With the starter it is possible to obtain a speed variation of from 2000 to 3000 r.p.m.

Coal Briquette Production in 1913

Coal briquettes totaling 181,859 net tons, valued at the plants at \$1,007,327, were manufactured in 1913, according to Edward W. Parker, of the United States Geological Survey. The figures for 1913 show a decrease of 17 per cent. in the tonnage manufactured but an increase of over $5\frac{1}{2}$ per cent. in value compared with 1912. Seventeen briquetting plants were in operation during the year—eight in the Eastern States, five in the Central States, and four on the Pacific coast. Seven used anthracite culm or "fines," five used bituminous or semi-bituminous coal, two used carbon residue from oil-gas works, and the others used mixed coals. Coal-tar pitch is the principal binder employed, eight plants using it. Patented binders were used at five plants. On the Pacific coast the number of operating plants increased from three to four, and the production in 1913 was exactly double that of 1912, with a gain in value of somewhat larger proportion.

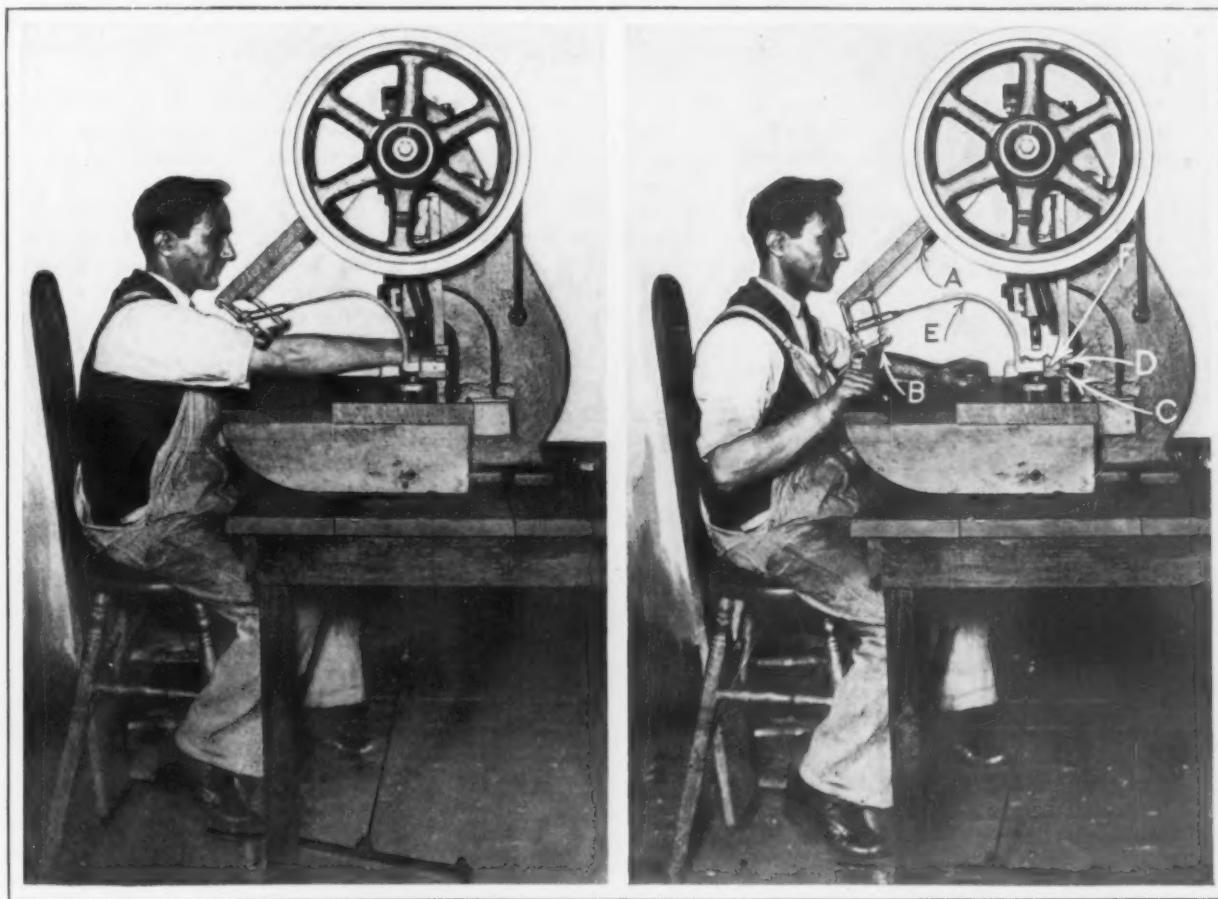
A Positive-Acting Safety Press Guard

The New Device of the Corbin Cabinet Lock Company for Locking the Tripping Mechanism While the Hands Are in Danger

The safety guard for presses and drop hammers which the Corbin Cabinet Lock Company, New Britain, Conn., is putting on the market is one of the most important of the devices which have been brought out for the purpose of minimizing the risk of accident to employees. It is a well understood fact that the power press is the most dangerous type of metal working machine, and the danger is accentuated by the fact that in very many cases the operators are not recruited from the most intelligent class of labor. In plants where presses are used in large numbers the percentage of accidents and the resulting losses from idle hours and from compensation

hands can reach the danger zone of the dies, the pressure of the arms upon the bamboo bar positively locks the tripping mechanism so that the ram cannot descend. Before the machine can start both hands must be withdrawn. When it starts no danger exists unless the operator actually thrusts his hands over the guard, which would be a clumsy and difficult thing to do and would be so deliberate an action as to be classed as intentional. It has been said that the guard "follows the arm like a shadow."

The mechanical operation of the safety guard is shown clearly in the illustrations. The frame A is held in a bracket bolted to the front of the housing.



Two Views of a New Safety Guard for Presses and Drops Showing the Tripping Mechanism Locked and the Hands Safe and the Hands Being Held Back from the Danger Zone When the Press Is Ready to Act

for injuries reach large totals unless the machines are equipped so that the man or woman is actually prevented by mechanical means from taking risks either deliberately or through carelessness.

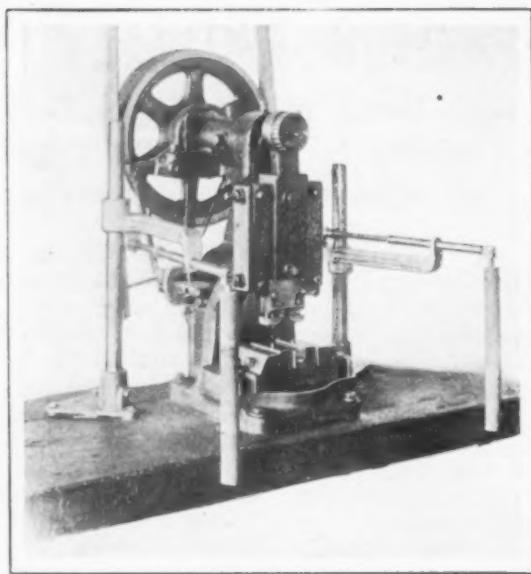
This new safety device possesses wholly original features. The operator works with the contact of a light rod against the arms above the elbow. The pressure is hardly felt and there is no interference whatever with the action of the hands. Production is carried on under a condition which secures the highest possible output for both hands and one foot are used. After a very short experience the workman has no thought whatever of the presence of the mechanism. He does not see it, and he is unconscious of the bar. The weight against his muscles is never more than a few ounces. But before the

Swinging free at its lower end where the operator sits or stands, is a bar of bamboo, B—any other light material would do as well—suspended by metal strips. The frame is adjustable so that the position of the bar in relation to the arms of the operator can be easily fixed, which is necessary because of the variation in reach. Ordinarily the individual operator works at the same machine month after month so that changes are seldom necessary, but when they are required, the guard can be made to conform to any physical characteristic. On the side of the frame is bolted a bracket, C, and on the tripping rod or chain is a dog, D. A rod, E, connects one of the metal arms, which support the bamboo bar, with the lock F that is integral with it. The movement of the lock is assisted by a guide. It

will readily be seen that to push forward the bamboo bar is to thrust the lock between the bracket and the dog and when it is so interposed the press cannot trip.

When the treadle is pushed down the lock comes in contact with the side of the dog on the tripping bar. Therefore, while the foot is on the treadle the operator's arm cannot force the bamboo rod forward and the press cannot repeat, as many presses will so long as the treadle is down. The workman is forced to act for his own safety. In this connection the statement of one of the great manufacturers of presses is of importance:

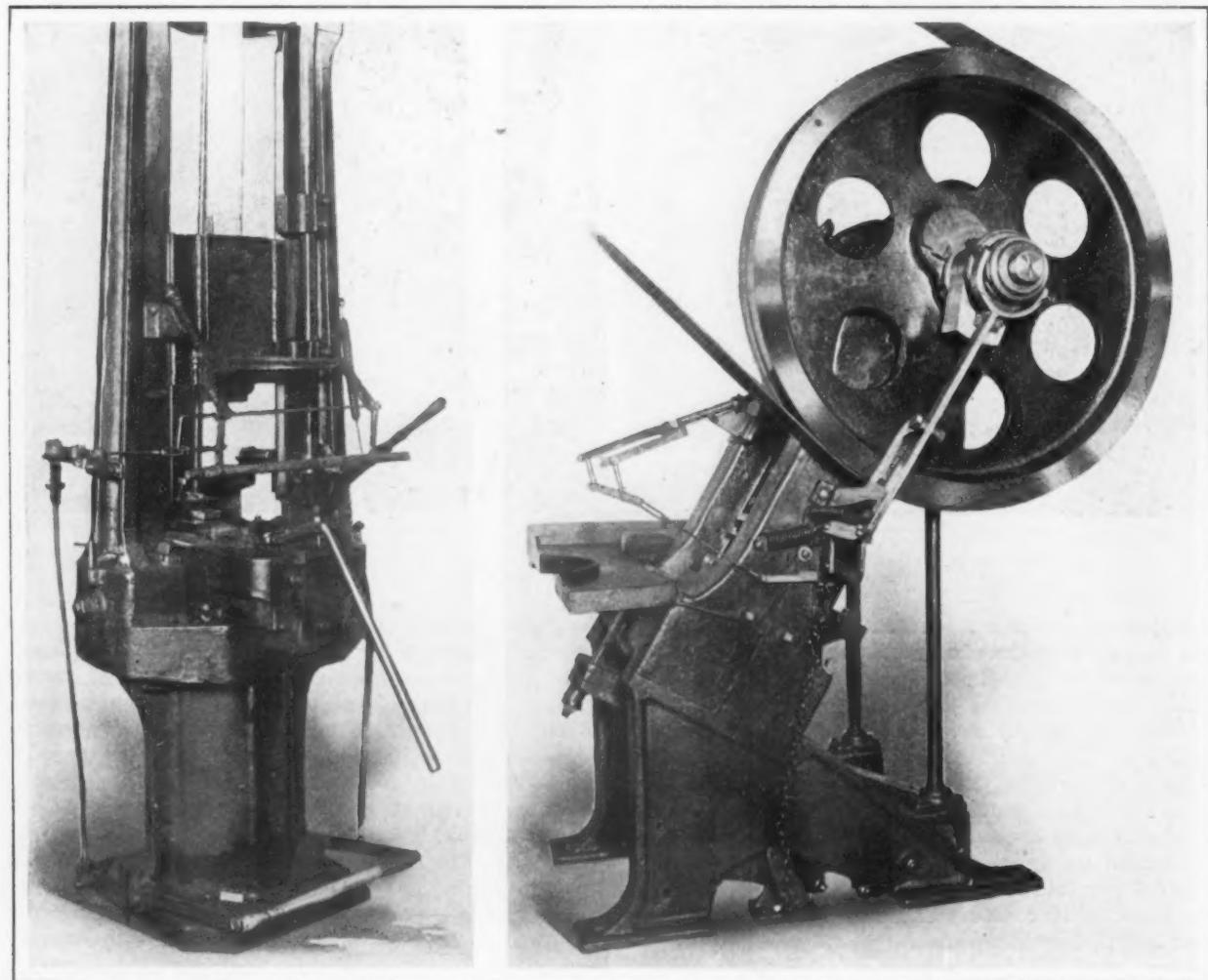
"In over 90 per cent. of accidents to operators of power presses it is claimed by the injured that the press repeated, but in nearly every instance it has been proved that the press was in good order, and the operator himself caused the accident by neglecting to remove his foot from the treadle after making an operation, thereby locking the wheel to the shaft for another revolution and causing the slide to descend a second time." However, sometimes a press is found to repeat in the true sense of the word, through mechanical defects, and



The Guard Adapted for a Small Bench Assembling Press

in such cases an attachment can be furnished to the Corbin safety guard which acts with the descent of the ram positively to throw the operator's hands back out of danger. With this attachment a dog is bolted on the face of the ram, and on the frame of the guard is mounted a bell crank lever, one end being long enough to engage the bamboo bar and the other long enough to engage the dog on the ram, should the operator have his hands within the danger zone at the moment that the press repeats, the bar then being pressed forward. The bell crank strikes the bar a sharp blow, throwing back the arms. This device is especially useful in connection with drops and hammers.

In one of the engravings a workman is seen sitting at his press which is about to perform one revolution. The withdrawal of his hands has permitted the bamboo bar to reach its lowest position. Swinging freely as it does gravity insures this motion. The lock has therefore been withdrawn and the pressure of the treadle will trip the mechanism. In another view an operation has been completed and the man has thrust his hands under the ram. The action of pushing his arms forward has brought



The Guard Applied to a Board Drop Hammer and a Heavy Inclined Redrawing Press

them again in contact with the bamboo bar and carried it with them, thus inserting the lock between the bracket and the dog. In this position he may press the treadle as much as he likes, but he cannot make the ram descend because the press cannot trip.

It will be noted that the feeding motion of the operator is wholly natural. Careful comparisons have demonstrated that speed of production is not decreased at all as compared with presses which are without the guard. Some hundreds of presses have been equipped with the device and experience covering a considerable period of time has proved that an accident is so rare an occurrence as to bring the press into the class of machines which are considered safe.

The safety guard is interchangeable between machines. The bracket which holds the frame is of standard form and size, and the frame is quickly slipped out when desired. The bracket is also arranged to swing clear, to one side of the machine, when it is desired to change the dies. In some cases two brackets are attached to the frame, one for use when the operator is sitting, the other when he is standing. The size of the press does not matter. The guard is in use on 600-ton machines as well as on the smallest type of bench presses. It is also applied to the best advantage on drops of all descriptions. The mechanism is so simple that it may be adapted to presses of the older types, the only variation in mechanism being in the style of the bracket and the dog.

An interesting application of the idea is illustrated in connection with a small bench assembling press. With this type of machine the work is fed to the dies from the sides and not from the front. The operator sits with his arms outside of the two suspended bamboo bars. Each of these is attached to a small shaft, at the other end of which is a gear segment. This meshes with a rack cut in the rod that actuates the locking device. The bamboo bars are in contact with the arms above the elbows when the hands approach the dies and the resulting movement of the bars causes the locking rod to move and insert the lock between the bracket and the dog.

With large presses where two men are employed, the operator being at the front and his helper at the rear feeding the material toward him, experience has proved that the helper is the more frequently injured of the two, because the operator may trip the press before his assistant has withdrawn his hands. Here a Corbin guard is placed at the back as well as at the front of the machine and not only the operator but his helper must have withdrawn his hands before the locking mechanism is released.

The factory site formerly occupied by the Tobin Arms Company at Norwich, Conn., has been purchased by the Warner Arms Corporation, Brooklyn, N. Y., manufacturer of automatic firearms under German and American patents. The Brooklyn plant will soon be removed to Norwich, where greater facilities will be enjoyed. The Warner Arms Corporation states that for 100 years or more Norwich has been regarded as an industrial center for firearms manufacture and is supposed to have more skilled labor in this art than any other city of its size in the country.

By substituting electricity for steam as the driving power for its large rolling mill at a cost of \$140,000, the Stora Kopparsbergs Bergslags A. B. in Sweden will increase its productive capacity 80 tons per hour. The current is to be derived from the new power station at Bullarfos.

New Line of Open-Back Inclinable Presses

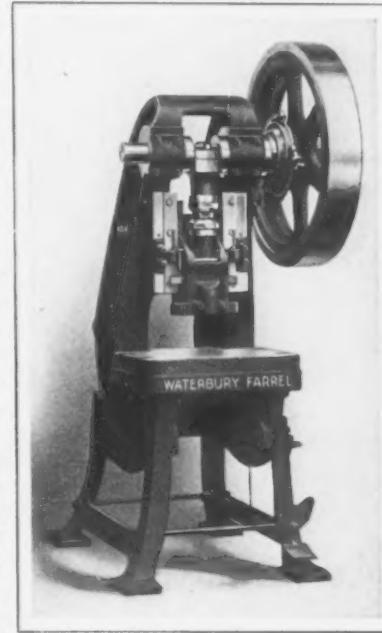
A line of single-acting open-back inclinable presses, known as the Standard Series E, has been brought out by the Waterbury Farrel Foundry & Machine Company, Waterbury, Conn. They are designed to supply the demand for inclinable presses having tool spaces large enough to take the tools used by the manufacturers of tin boxes, etc., and at the same time have more weight and thus be more rigid than commonly obtainable. In addition to extra tool space, it is pointed out that the presses are adapted to a variety of press work and are constructed so that the various types of automatic feeding attachments such as ratchet and friction roll feeds, ratchet and friction dial feeds, die knock-outs, finger motions and numerous other special devices can be applied readily as they are needed.

The frames are heavy and the uprights are tied at the back, a construction which is relied upon to give the required rigidity. All of them have long well-guided gates with large bearing surfaces, and it is emphasized that the overhanging type of construction for the crankshaft and gate gives the maximum amount of tool space in all directions as well as permitting the attachment of the gate knock-out shown. The builder's friction clutch is included in the equipment, as is also a patented screw connection made for heavy service. Features of the connection are a large diameter of the center screw and a positive locking device. The machines can be built with back gears for slow speed for punching heavy work. A small size of machine for bench work is also manufactured.

The Russian Shortage in Pig Iron

To relieve the scarcity of pig iron in Russia, referred to in *The Iron Age* of March 19, a bill embodying the recommendations of the conference recently held will empower the council of ministers to authorize, on separate application in each case, the importation from abroad until December 31, 1915, at reduced rates of duty, pig iron for the needs of the metallurgical industry up to a maximum of 270,525 tons. The Russian shortage in steel will be made up by importing 55,000 tons of billets, which are likely to be bought in Germany.

Statistics show that at the beginning of 1914 the Russian combination of steel companies known as the Prodomet consisted of seven works in Poland, two in the Urals, two in the Baltic provinces, two in central Russia, and 16 in Southern Russia, employing together over 100,000 hands and having a capital of 250,000,000 roubles. The production of pig iron increased 31 per cent. in 1913 and that of steel 23 per cent.



A Single-Acting Open Back Inclinable Press Possessing a Large Space for Tools

The Brier Hill Steel Company's New Works

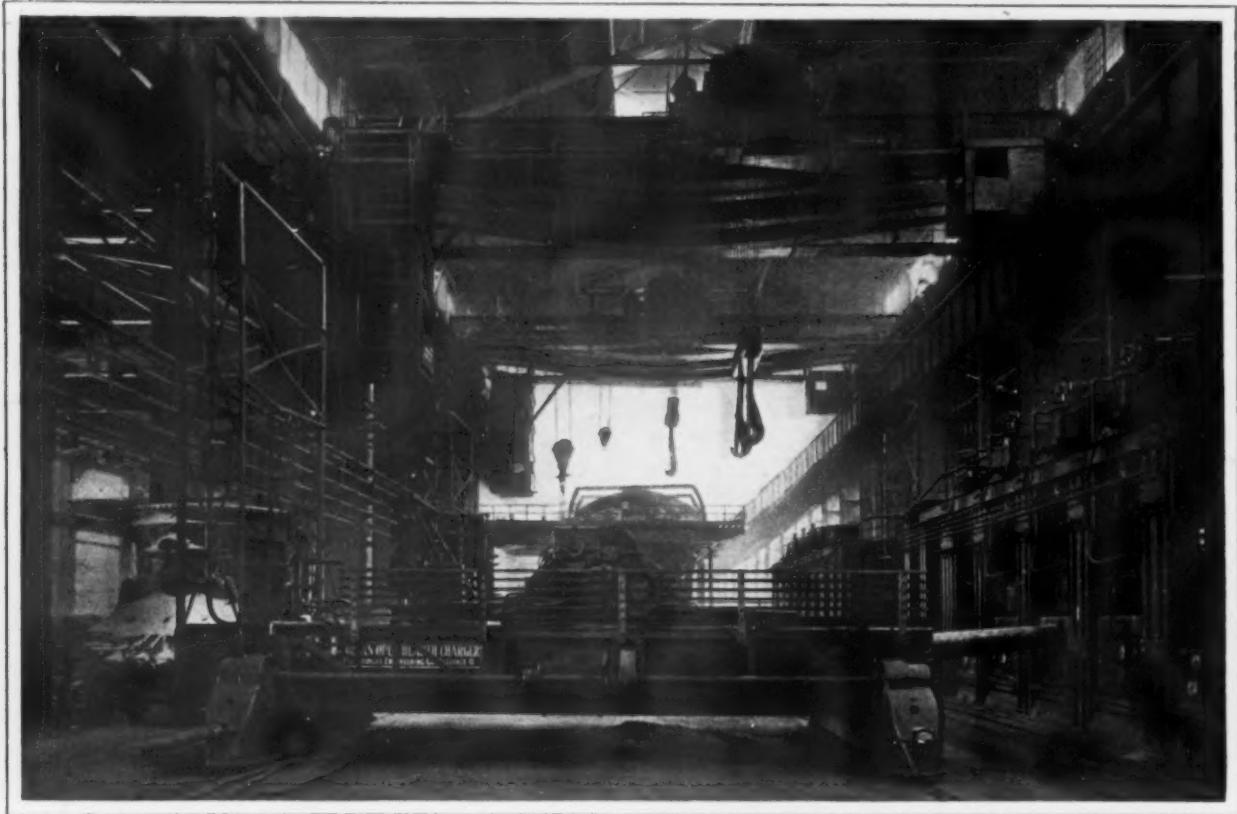
Open-Hearth Plant and Mills for Producing Sheet Bars, Billets and Slabs—Youngstown, Ohio, Now More Conspicuously a Steel Center

(With Supplemental Plate)

There has been completed and put in operation at Youngstown, Ohio, the new open-hearth steel plant of the Brier Hill Steel Company, this giving four open-hearth steel works in that city and making it one of the largest steel centers in the country. The four plants in the order of their building are the Ohio Works of the Carnegie Steel Company, which has twelve 60-ton furnaces; the plant of the Republic Iron & Steel Company, illustrated in *The Iron Age* of August 17, 1911, which has ten 60-ton furnaces; the works of the Youngstown Sheet & Tube Company, illustrated in *The Iron Age* of August 14, 1913, and last, the Brier Hill plant.

heavy demand to get steel promptly and, occasionally, of the quality desired. With these facts before them, the Brier Hill Iron & Coal Company, operating the Grace blast furnace at Youngstown; the Youngstown Steel Company, owner of the Tod furnace, also at Youngstown; the Thomas Steel Company and the Empire Iron & Steel Company, both with sheet mills at Niles, Ohio, making black and galvanized sheets and formed products, decided that their interests would best be conserved by consolidating their properties into one company which should build on open-hearth steel plant.

In January, 1912, the Brier Hill Steel Company

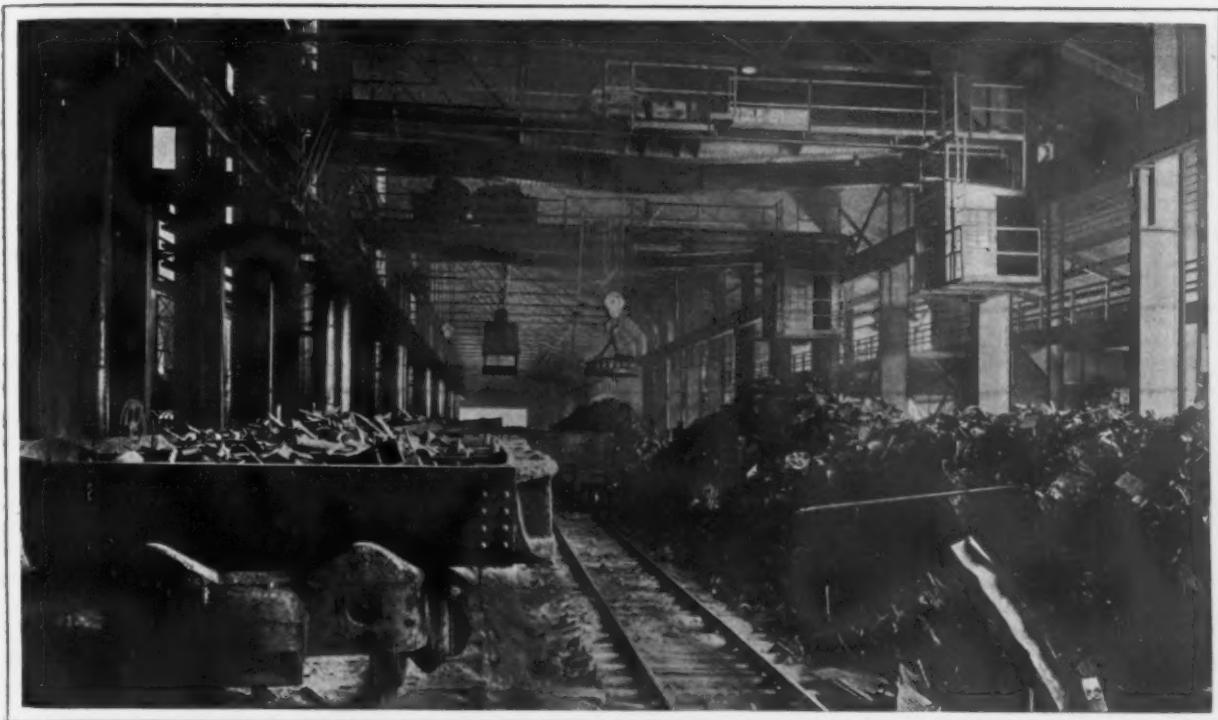


Open-Hearth Charging Machine with its Trolley Tower, Showing Also Two 100-ton Hot Metal Ladle Cranes

Bessemer steel plants are also operated at Youngstown by the Republic, Carnegie, and Youngstown companies. At the present time the Youngstown district has a daily producing capacity of close to 5000 tons of open-hearth steel and 5500 to 6000 tons of Bessemer steel.

Some years ago the merchant blast furnaces in the Youngstown district usually found a ready market for their pig iron, but with the building of one steel works after another, all equipped with blast furnaces to furnish the metal needed, the market for the sale of pig iron steadily contracted, and this was one of the main reasons for the organization of the Brier Hill Steel Company and the building of its open-hearth plant. Another reason was the desire of several sheet mills in the Youngstown district to have their own supply of sheet bars, these mills having found it difficult in times of

was organized with a capital of \$15,000,000, and took over Grace and Tod furnaces and the Thomas sheet mills at Niles, Ohio. Tod furnace is 79 x 19 ft., equipped with five hot-blast stoves, and has a capacity for making 120,000 tons of pig iron per year. Grace furnace is 85 x 20½ ft., equipped with four hot-blast stoves 19½ x 85 ft., and has an annual capacity of close to 140,000 tons of pig iron. The Thomas works contains 12 hot sheet mills and the Empire works has 8 hot sheet mills; the two plants have a combined annual capacity of 125,000 tons per year of black and galvanized sheets and formed products. Thus the Brier Hill Steel Company was equipped with blast furnaces to make its own pig iron, and also had its own finishing mills to take the larger part of its output of steel. The company also owns extensive coal lands in the Connellsville district, and also has large ore holdings in



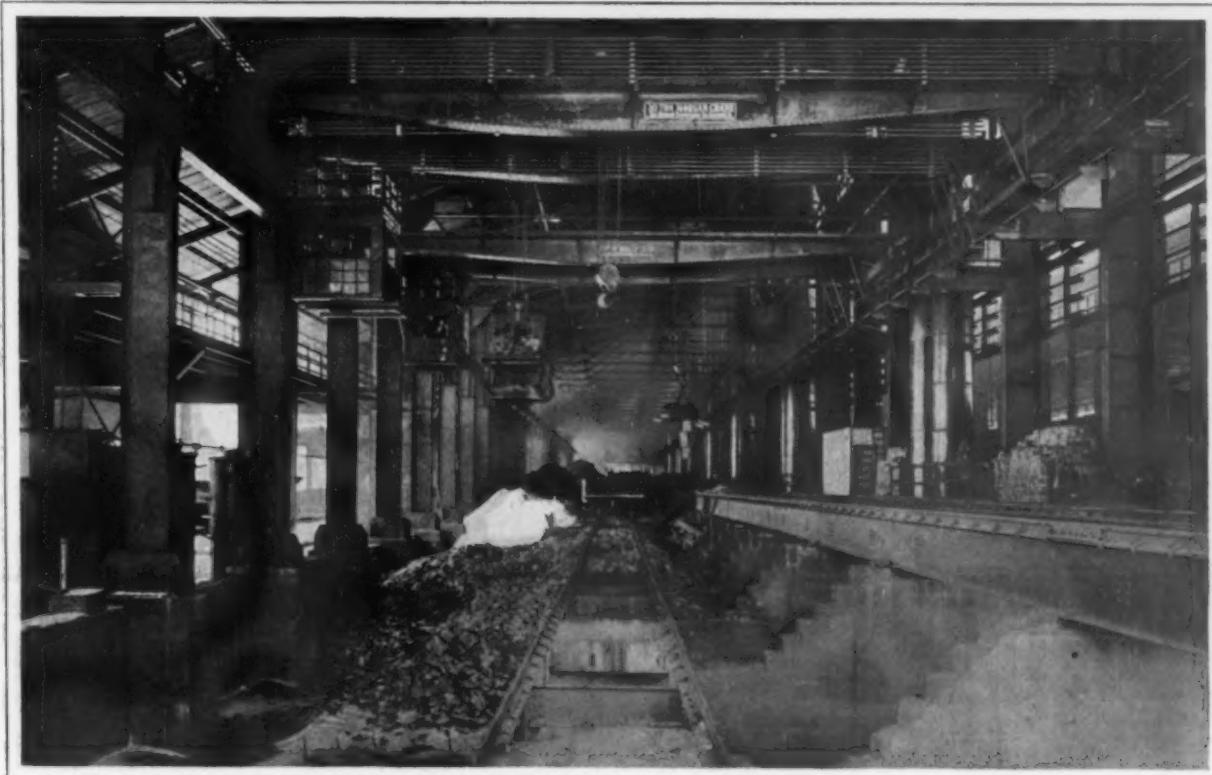
Stock House for the Open-Hearth Plant Showing Cranes with Magnet and with a Special Bucket for Handling Materials

the Lake Superior district. To round out its position as a large producer of pig iron and finished materials, a steel works was essential, and this has been built and put in successful operation. As a legacy from the old Brier Hill Iron & Coal Company, the Brier Hill Steel Company became the owner of a large tract of land west of the Grace and Tod furnaces facing the Mahoning river, and on this site the new steel works has been built.

Reference to the ground plan, given herewith as a supplement, will show the general layout of the plant. It will be noted that provision has been made for doubling the size of the plant, when the demand from its own finishing mills or from the

outside market warrants. The present steel plant is designed to roll billets, slabs and sheet bars exclusively, the plant having no finishing mills. Active work was started about a year ago, and on February 7, 1914, the first sheet bar was rolled, and the first sheets from the bars were rolled in the Thomas works at Niles on February 13, as noted on page 505 of *The Iron Age* of February 19, 1914.

The plant contains seven 75-ton open-hearth furnaces and has a rated capacity of 1200 tons of steel per day, and it is equipped with a 600-ton metal mixer. There are four 4-hole soaking pits provided as sufficient for the open-hearths' capacity. There is a 40-in. reversing blooming mill, driven by



View of Open-Hearth Stock House from Opposite End to That Shown Above

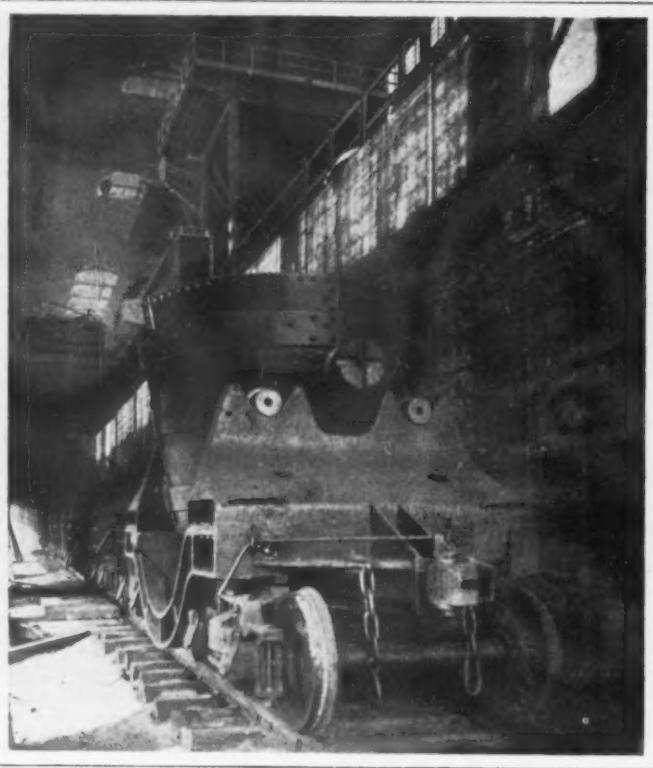
a Tod engine, and following the blooming mill is a 6-stand continuous billet and slab mill and also a 24-in. merchant mill with 6 stands of rolls on which sheet bars and small billets are rolled. The merchant mill is driven by bevelled gears coupled to a 34 and 68 x 60-in. horizontal cross-compound Tod engine and the continuous mill is driven by a similar engine through spur gears. The open-hearth department is located west of Grace and Tod furnaces facing the Mahoning river, and the continuous billet and merchant mills are located about 1000 ft. further west, the intention being to use the intervening vacant ground for future extensions to the open-hearth furnaces, soaking pits and the like.

THE OPEN-HEARTH PLANT

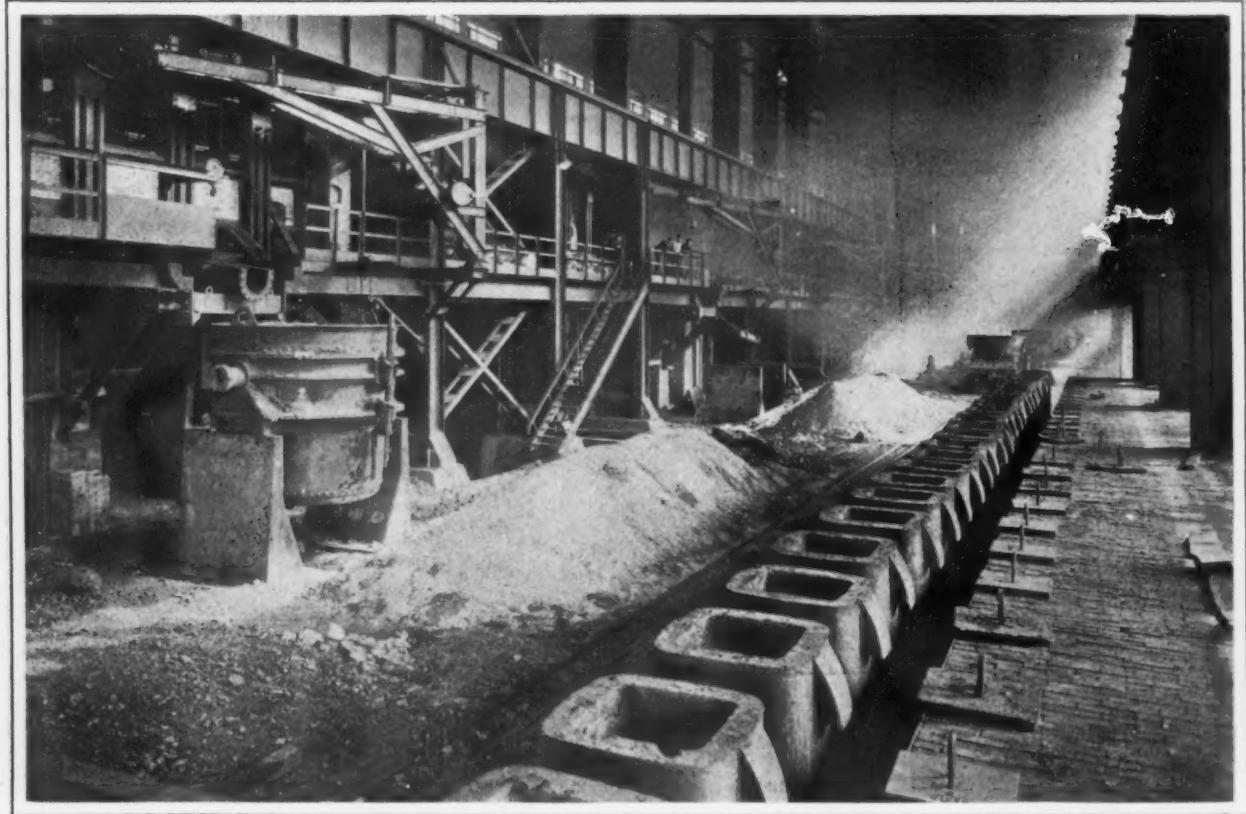
contains seven 75-ton furnaces as stated, and there are provisions for seven more. The plant was built from designs of Julian Kennedy, consulting engineer, Pittsburgh. The furnaces are contained in a steel frame building 260 ft. wide and 670 ft. long. Forty-five-ton hot-metal ladle cars are used, built by the William B. Pollock Company. An unusual feature in the practice at this plant is that the cars

are employed to carry a 45-ton ladle between the metal mixer and the open hearths. The molten metal from the Grace and Tod blast furnaces is brought in these cars and weighed on a 250-ton Fairbanks scale in the open-hearth department. A 100-ton Morgan electric crane lifts and tilts the ladles, and the height between the ladle car track and the crane is 92 ft. The hot metal from the mixer is emptied into a 60-ton ladle mounted on Pollock cars of standard gauge and the cars are hauled to the open-hearth furnaces by a General Electric 20-ton locomotive. A Morgan 100-ton crane with a span of 78 ft. handles the ladle when the hot metal is being

charged into the furnaces. This crane is equipped with a 40-ton auxiliary for tipping the ladle. Other materials, such as scrap, ore, etc., are charged into the open hearths by two 5-ton low-type Morgan machines. The charging boxes are of cast steel built by the Variety Iron Works Company, Cleveland. The 600-ton mixer, built by the William B. Pollock Company, Youngstown, is located in the eastern end of the open-hearth building and is of the standard, electrically tilted type.



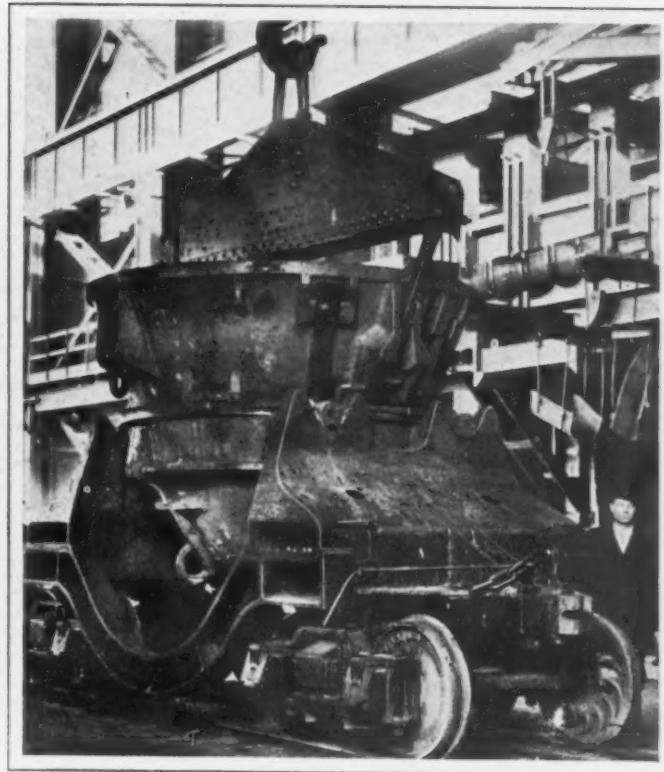
Hot Metal Ladle is Lifted 79 ft. to Mixer



Tapping Side of Open-Hearth Furnaces from One of the Pouring Platforms

The open-hearth furnaces are 71 ft. in length over all and 17 ft. in width over all. The hearths are 34 ft. long and 13 ft. 6 in. wide. The bindings are of extra heavy steel, and the hearth pans rest on heavy beams and are supported on four brick-capped concrete piers. The checker work in the chambers is of the vertical flue type, similar to blast-furnace hot-blast stoves. The furnaces are equipped with the Knox patented water-cooled doors, door frames and bulkhead coolers and also with water circulating system for cooling. The charging doors have a clear opening of 3 ft. 6 in. x 3 ft. The regenerators are located back of the furnaces and are 16 ft. long and 22 ft. in depth, the gas chambers 9 ft. 4 in. in width and the air chambers 12 ft. 6 in. Each furnace is equipped with its own stack 5½ ft. in diameter and 165 ft. high, all brick lined. The pouring bay is 60 ft. in width and is served by two Morgan 150-ton ladle cranes. There are two pouring platforms, one being 130 ft. long and the other 105 ft. The ingot molds are carried on 6½-ton trucks built by the Aetna Foundry & Machine Company, Warren, Ohio.

Slag cars, of 250 cu. ft. capacity, also of Pollock



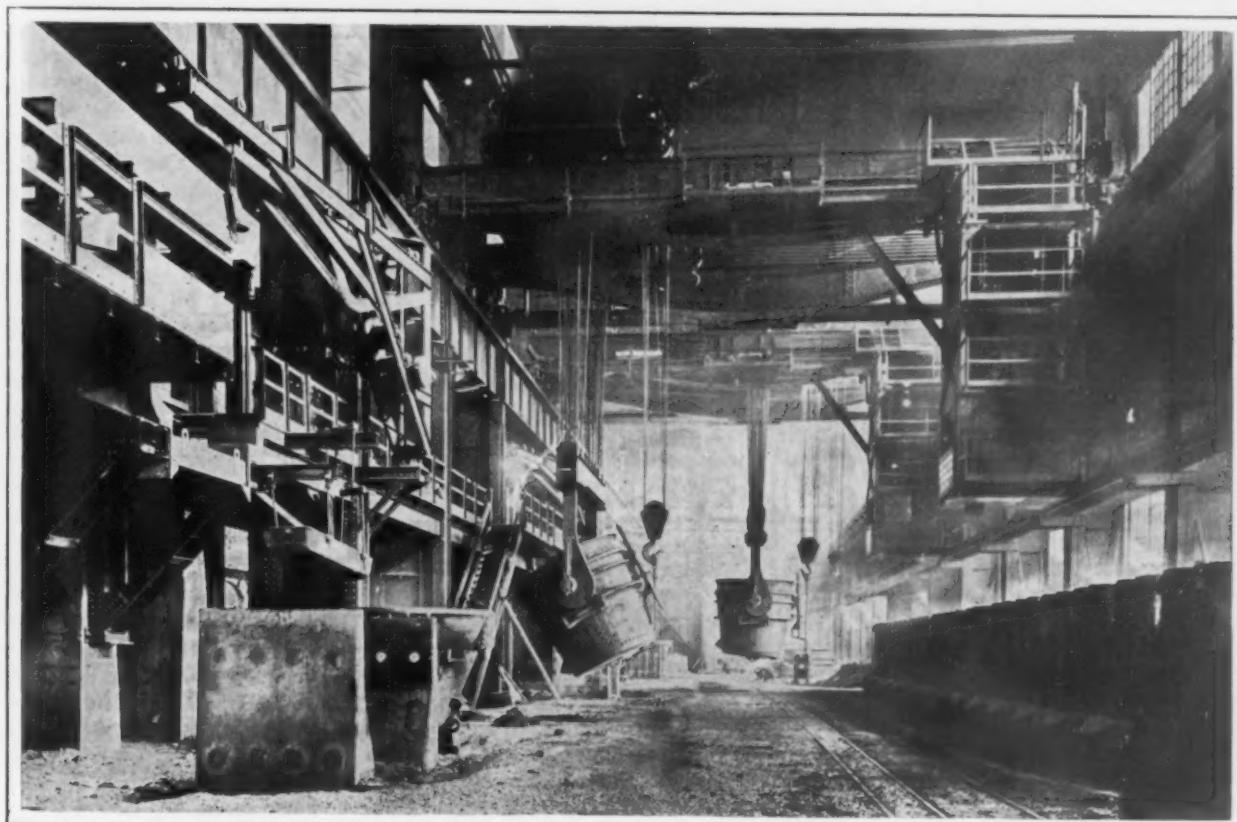
The 260-eu. ft. Capacity Slag Pot and Car

manufacture are used. The slag is run into a pot which rests on a stand alongside the steel ladle. The pot is then lifted by means of the auxiliary hoist of the steel ladle crane and set into a trunnion ring of a standard gauge car, taken to a convenient pit and the pot dumped over, depositing the slag. This slag is cooled and crushed, the steel scrap reclaimed by magnet and the slag loaded into cars and hauled away for filling purposes.

Instead of hauling the slag pot into the customary steam-tilting cinder car, the metal car truck is of such design that with a trunnion ring which

has journals, it can accommodate the slag pot also. Thus the metal cars used at the Brier Hill plant are interchangeable for service between the blast furnaces, mixer and pig casting machine and between the mixer and open-hearth furnaces and between the slag pits and slag dump. This is the first case in which such a plan has been carried out.

The gas equipment was installed by the Chapman Engineering Company, Mt. Vernon, Ohio. It comprises 22 Chapman producers, 18 of which are for the seven open-hearth furnaces and 4 for the



Pouring Floor Showing Two 150-ton Ladle Cranes



View of the Soaking Pits; Covers in Background Open

four pit furnaces. The producers are of the standard 10-ft. furnace type, having a maximum rate of gasification of about 1 ton of coal per hour, thus giving a total capacity for the installation of over 500 tons of coal per day of 24 hr.

To make the installation flexible, the plant is arranged in three groups of five producers, each such group supplying two furnaces and one group of three producers for the last or seventh furnace. In the distribution of gas from a battery of five producers the middle producer of the set is connected with the gas flues in such a way that its gas may be thrown to either of the two furnaces served, giving three producers to one furnace, and two to the other, or it may be divided between the two furnaces. The adjustment is done by dividing the main gas flues in two separate sections by a middle partition, making two separate flues. From each of these an underground flue leads to the furnaces. Down-comers from No. 1 and No. 2 producers lead into one flue, and from No. 4 and No. 5 producers into the other, but the connection from No. 3 producer enters a short cross flue connected with two down-comers, leading to opposite sides of the partition wall in the flue. In each of these down-comers a mushroom shut-off valve is placed, the stems being connected by a cross arm so that as one valve is raised the other is lowered. Thus the gas may be thrown into one or the other flue by shifting the valves or may be divided between the flues by keeping both valves in the half-way position.

The producer houses are of heavy steel frame construction, contiguous with the open-hearth building. The supporting members carry the overhead coal bins and the supports for an overhead runway for the coal conveying larry. The producer foundations are on the ground floor level, which permits ready access to the lower working parts of the producer and gives good drainage for the waste

water. The charging platform is of steel plate partially supported by the producers themselves. It is virtually a second story, being well above the concrete floor, and is about 95 ft. x 27½ ft.

Coal is supplied from overhead bins of 12 tons capacity each. The bins have the form of an inverted pyramid directly over the hoppers of the producers, and terminate in a gate through which the coal falls directly into the charging hopper. The operation of charging consists in swinging open the lid of the charging hopper, filling this hopper with about 200 lb. of crushed coal from the bin, closing the hopper lid, and dumping this charge into the producer. Coal crushed and passed over a ¾-in. screen is supplied to the bins as needed by a larry, which travels on an overhead runway extending from the coal crusher through all the producer houses. It carries about 6 tons at each trip.

The producer itself consists of a stationary top with two revolving sections, of which the upper rotates once in 20 min. and the lower once in 80 min. The fuel undergoing combustion is twisted by this differential rotation, so that blow holes in the fire bed are squeezed out and closed as fast as they form. The producers have no grate bars, being of the type in which the ash bed itself replaces the grate, the pressure of the blast being held by a water seal. The blast is distributed over the fire bed through a stationary hood 7 ft. in diameter, concentric with the revolving sections. The blast escapes from this hood through a number of tuyers and a regulating device is provided for directing the blast to the inner or outer sections of the fire or dividing it between them as may be desired. The steam is given a superheat of 75 deg. at the boiler house, to insure dry steam at the producers.

The pit furnaces are located in a steel frame building, 30 ft. x 72 ft., and are four in number, each with four holes, each hole accommodating eight ingots. Space is provided for four more sim-

ilar furnaces. Their construction is of the standard type, the covers for the holes being steel castings, brick lined, hydraulically operated, and having a lift of about 3 ft. A platform runs the full length of the pit furnaces on which is located all the apparatus for operating the valves, etc. The reversing valves used were built by the Brier Hill Steel Company from its own designs. The valves are large, water-cooled mushrooms, seating in a water seal. Each side of the furnace has its valves as a separate installation, and each valve has a single function only. The proper sequence of operating the valves is wrought out in the connections of the hydraulic control, so that only two levers are needed for manipulating the eight separate valves.

THE BLOOMING MILL

Taking an ingot 19 x 21 in., weighing 5800 lb., which is as large as good economy in heavy mill practice requires, the blooming mill will deliver a $7\frac{1}{2}$ x $7\frac{1}{2}$ -in. bloom in 13 passes. These pieces will be carried through the $7\frac{1}{2}$ x $7\frac{1}{2}$ -in. bloom shear (the butts falling into the butt conveyor beneath) to the approach table of the continuous mill. The pieces are reduced in the 24-in. 6-stand continuous mill to 8 x 2-in. and 4 x 4-in. sections, and cropped or cut to the desired length on the intermediate shear, transferred across and delivered to the 24-in. 6-stand merchant mill and reduced to 1 $\frac{1}{2}$ -in. and 2-in. billets and sheet bars, which are run out full length on the shear table and cut into five lengths by a battery of six gang shears cutting simultaneously. The sheet bars are then run out on the inclined table through the pinch roller, delivered to the bar piler and lifted by a crane which deposits them on the cooling beds until ready for shipment. The bar piler is portable and rests on top of the hot bed tables. When rolling billets, it is removed, and the inclined table lowered to a horizontal position, and the billets passed beneath the pinch rollers to the Morgan screw table and then delivered to the cooling beds. The blooming mill has a capacity of 100 tons per hour and the continuous and merchant mills are each designed to take care of this tonnage.

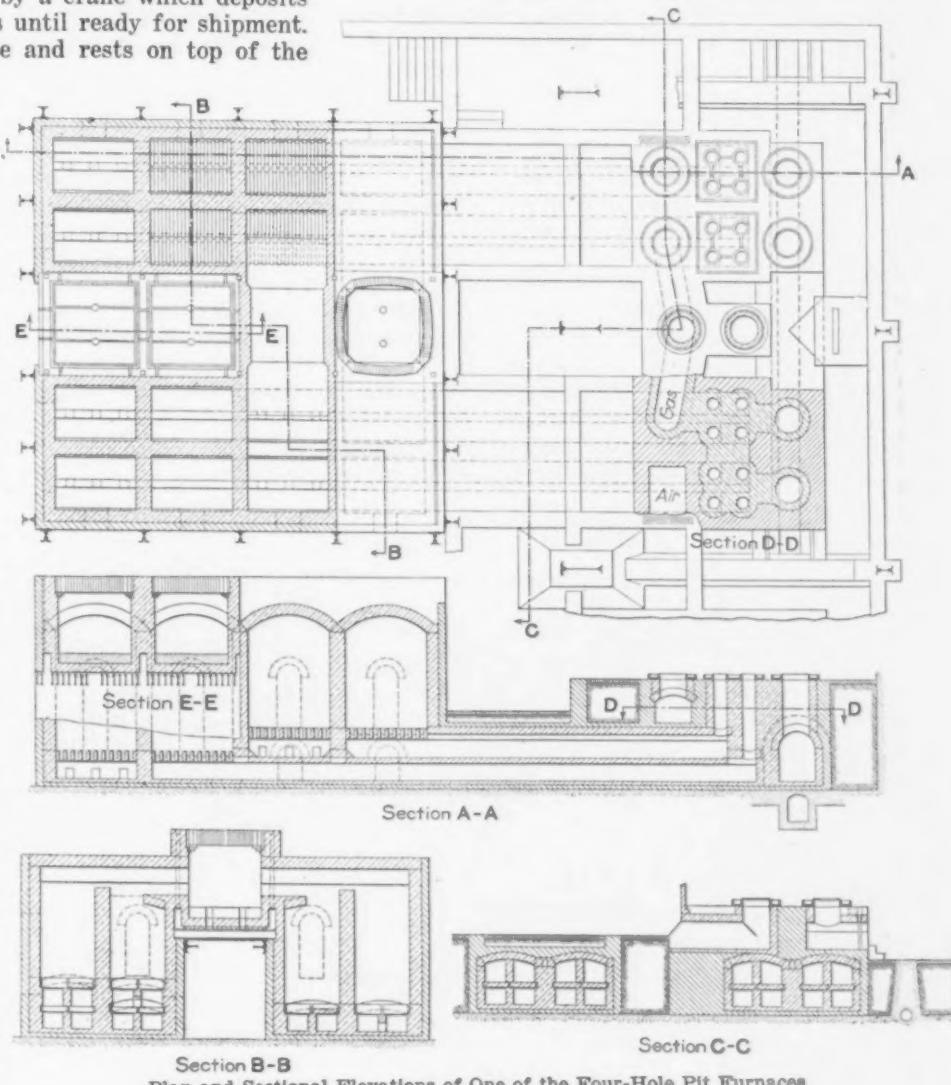
In addition the blooming mill is designed for rolling slabs up to 6 x 30 in. and blooms from 16 in. square down to 4 x 4-in. billets, which are transferred across from the blooming mill run-out table to the shear approach table and sheared to lengths varying from 18 in. to 15 ft. on a 1000-ton steam hydraulic shear from which the billets are run out and kicked off to a conveyor and delivered to special cars for handling them. Small slabs and 4 x 4-

in. billets which are rolled on the 24-in. continuous mill may be run out and transferred across to a 4 x 4-in. hydraulic shear and sheared to lengths of 18 in. to 15 ft. and delivered to cars as at the blooming mill.

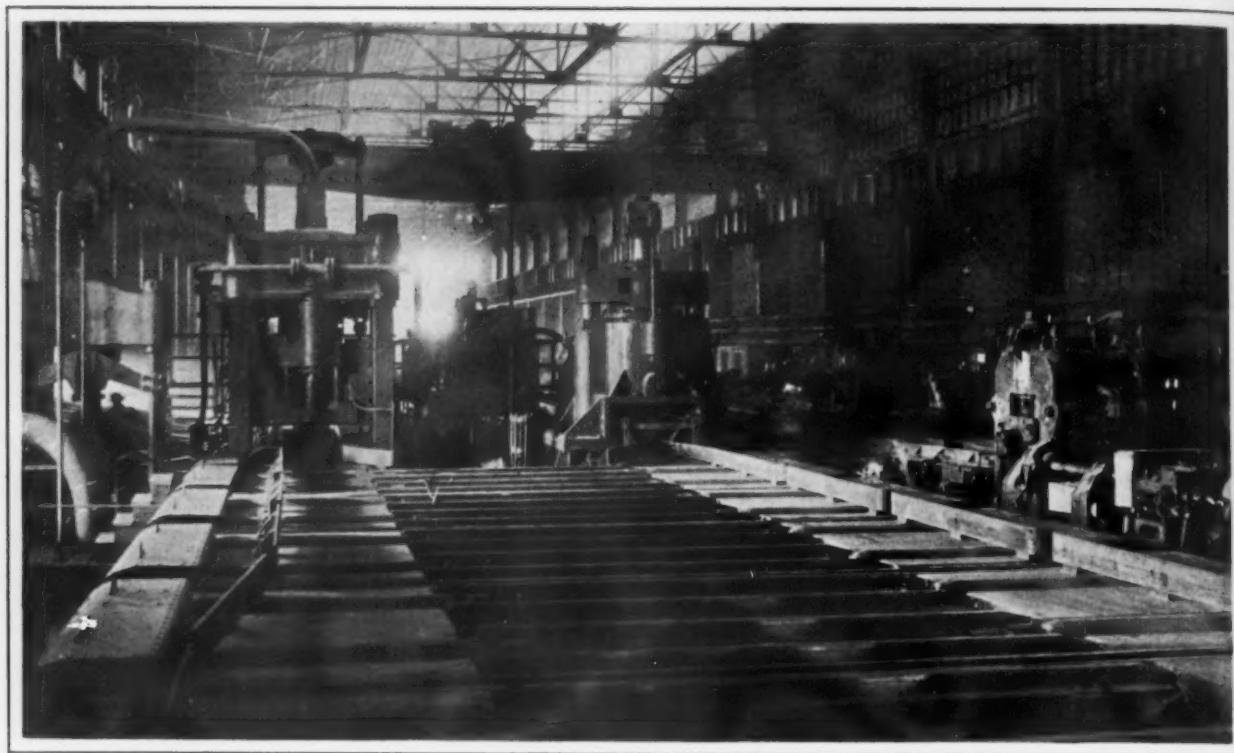
The ingots from the heating furnaces are delivered by a Morgan 5-ton charging crane to an electrically operated ingot car and discharged on the approach table which extends into the pit furnace building, so that in case of accident to the ingot run or car, ingots can be taken from any furnace and placed direct on the table. This is 60 ft. long and contains 25 rollers driven by two 100-hp. mill-type motors connected permanently in series, so that in case of accident to either motor the other one is capable of driving the table. This same arrangement of drive is applied to the front and rear mill tables. The rollers are steel castings with integral cast necks and the driving gears are manganese steel castings.

The front and rear mill tables are each 40 ft. long from the center of the mill, each containing 15 cast-steel rollers. The first five rollers on each side of the mill are forced and keyed to forged-steel shafts and the housing or feed rollers are carried loose on forged-steel shafts driven by the table line shafts. The shaft is carried in heavy, brass-lined bearings set in openings in the mill housing, which are large enough to permit of the removal endwise of the feed rollers. The rest of the table rollers are of the same construction as used on the approach table.

The table gears are manganese steel castings, and the table girders are of heavy I-beam construc-



Plan and Sectional Elevations of One of the Four-Hole Pit Furnaces



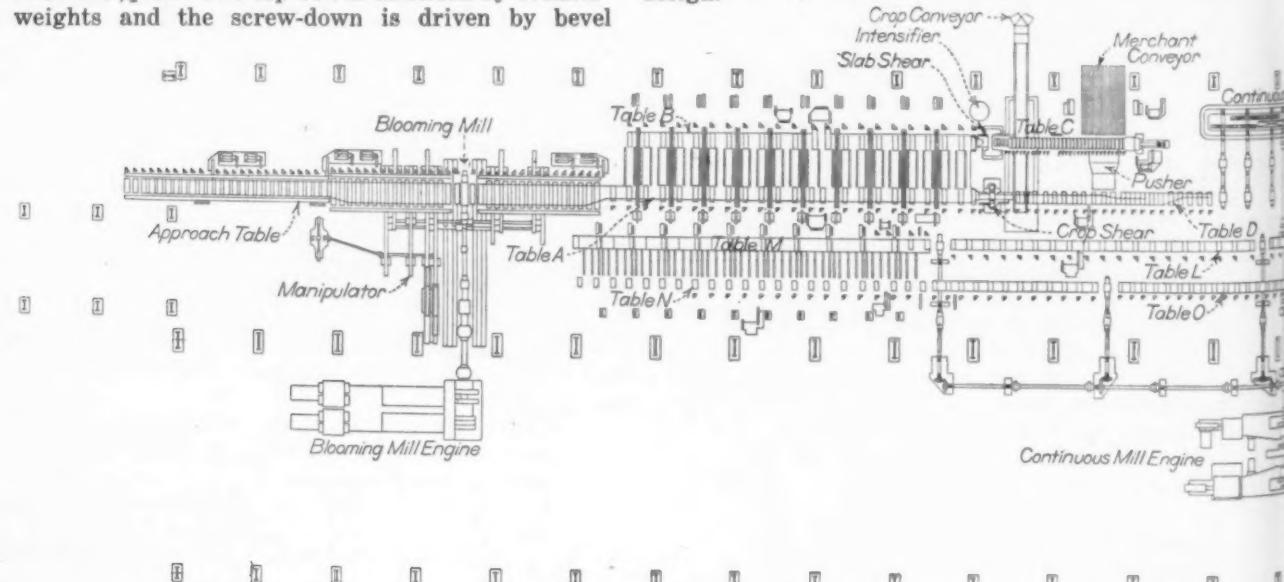
The 1000-ton Slab Shear on Left; 250-ton Crop Shear on Right

tion. The girders at the manipulator are of a deep section provided with openings through which the manipulator beams pass, and they are carried on cast-iron stands which also support the driving shafts and roller guides for the manipulator beams. The manipulator is of the Kennedy-Wellman type with hydraulically operated guards for manipulating the ingot on both the front and rear tables, and a hydraulically operated mechanism for turning the ingot on the front table. The racks and gears are steel castings with machine-cut teeth, and the cylinders for operating are all located on the drive side of the mill, easy of access for inspection and repacking.

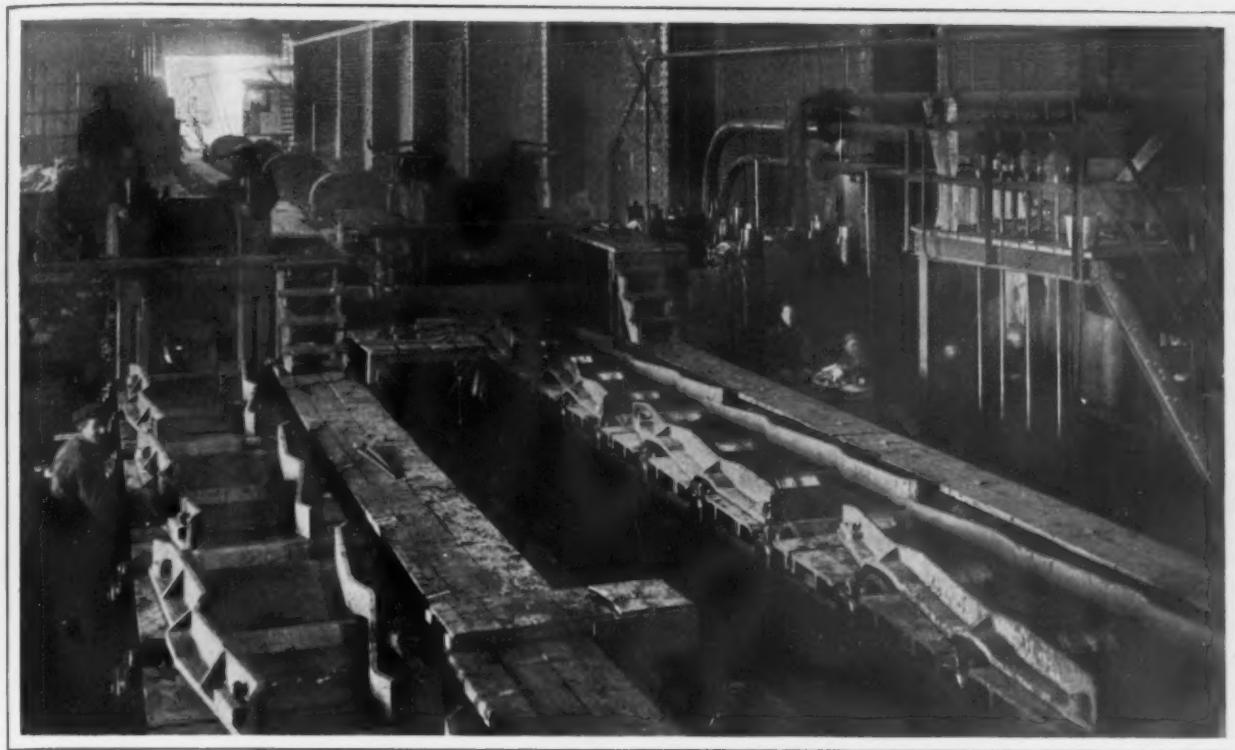
The blooming mill is similar in general construction to the mill recently installed by the William Tod Company in the plant of the Youngstown Sheet & Tube Company, as described in *The Iron Age*, August 14, 1913. The lift of the top roll is 30 in., the length of the roll between the bearings is 6 ft. 7 3/4 in. The top roll is balanced by counterweights and the screw-down is driven by bevel

gears, operated by two 100-hp. motors connected in series so that in case of accident to either motor, the screw-down may be operated by the other motor. The entire driving mechanism, although enclosed in a dust-proof case, is provided with means for complete and continuous lubrication of wearing parts, access for cleaning, and easy removal for re-pairs. The mill housings are heavy steel castings, weighing 100,000 lb., carried on heavy section cast-iron shoe plates, which are continued across and carry the pinion housing.

The pinion housing is a steel casting of Kennedy design, mounted on the mill shoes and contains two 40-in. nickel-steel pinions, machine cut, with double helical teeth, on a special helical gear planer, planed with not over 1/64-in. back lash. The driving spindle, connecting the bottom pinion to the engine, is a steel forging, 24 in. in diameter, 12 ft. 6 in. long, supported in a spring bearing and provided at both ends with a special flexible coupling of Kennedy design.



Plan of the Blooming Mill and

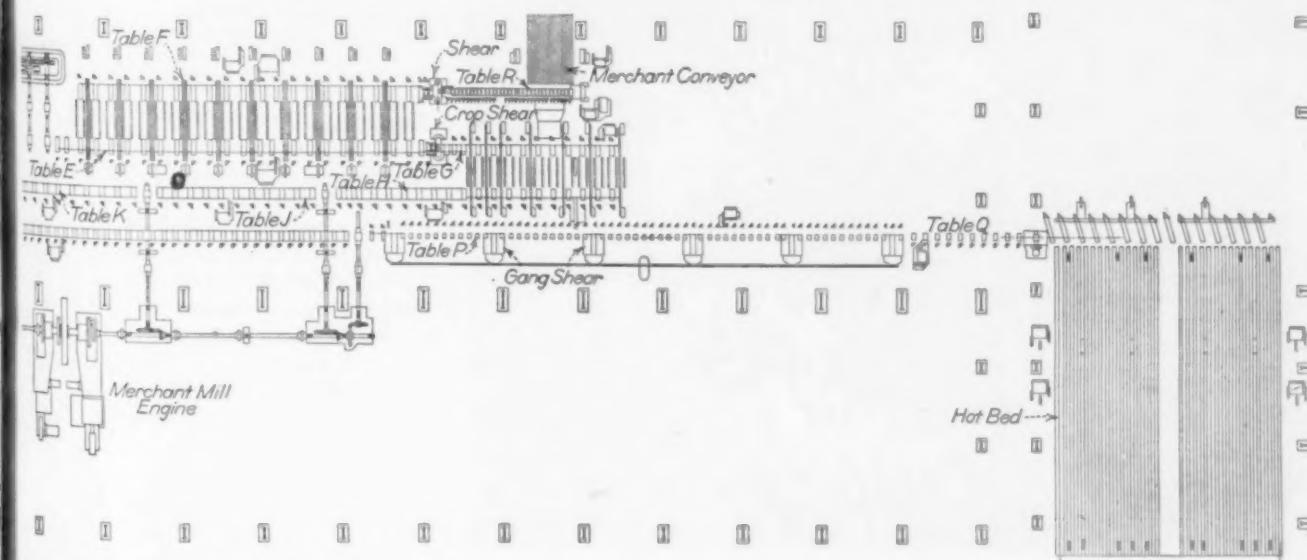


Stands 7 and 12, Merchant Mill, Showing Gang Shears in Background

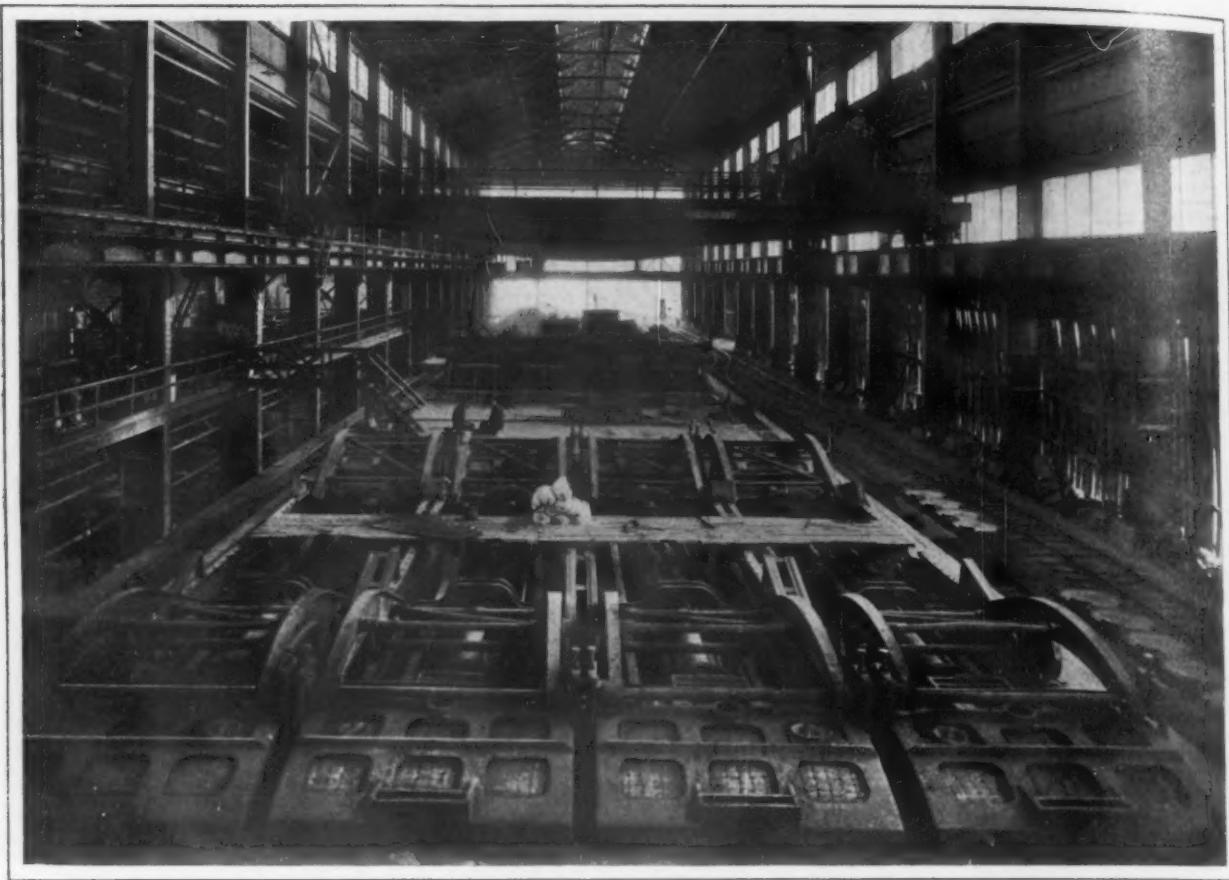
The shear approach tables are 113 ft. long and contain 25 rollers. They are of usual design driven by a 100-hp. motor and connected by a wire-rope transfer driven by a 50-hp. motor. The slab shear is of the steam hydraulic type operated by an intensifier and is designed for a working pressure of 6000 lb. per square inch with a capacity for cutting 16 x 16-in. blooms or 6 x 30-in. slabs. The intensifier is operated by means of a balanced piston valve controlled by a single lever located in the mill pulpit. One full stroke depresses the shear knife 10 in., which is sufficient for all ordinary work. When cutting thicker pieces, the intensifier makes two strokes, water being admitted for the second stroke by means of a prefill valve. The prefill valve is mounted on the intensifier and forms part of the water connection between the shear and the intensifier. Its object is to admit supply water to the system for changing the stroke of the shear, or for discharging water from the system when it is desired to increase the lift of the knife. Ordinarily the water is simply churned back and forth between

the shear and intensifier. The lever for operating the prefill valve is also located in the mill pulpit, and is only used when it is desired to make two strokes of the intensifier for one stroke of the shear, or for making up for losses due to leakage.

From the slab shear the pieces are run out on to the shear table, driven by a 50-hp. motor. The front end of the table is carried on the slab shear by means of a hydraulic push-back cylinder, and is so arranged that the depression of the table may be adjusted to suit the thickness of pieces being cut. The entire table is supported on rollers and may be drawn back to permit the crop ends to drop through to the conveyor beneath. The shear gauge is carried on two heavy steel bars, the front ends of which are attached to the shear and the back ends being carried on heavy steel girders and stands. The gauge proper is adjustably connected to the shear, so that the stop may be lifted as required by the thickness of piece being cut out. The slabs are pushed off of the table by a motor-operated pusher on to a specially designed reciprocating slab



Continuous and Merchant Mills



View of the Soaking Pits: Covers in Background Open

four pit furnaces. The producers are of the standard 10-ft. furnace type, having a maximum rate of gasification of about 1 ton of coal per hour, thus giving a total capacity for the installation of over 500 tons of coal per day of 24 hr.

To make the installation flexible, the plant is arranged in three groups of five producers, each such group supplying two furnaces and one group of three producers for the last or seventh furnace. In the distribution of gas from a battery of five producers the middle producer of the set is connected with the gas flues in such a way that its gas may be thrown to either of the two furnaces served, giving three producers to one furnace, and two to the other, or it may be divided between the two furnaces. The adjustment is done by dividing the main gas flues in two separate sections by a middle partition, making two separate flues. From each of these an underground flue leads to the furnaces. Down-comers from No. 1 and No. 2 producers lead into one flue, and from No. 4 and No. 5 producers into the other, but the connection from No. 3 producer enters a short cross flue connected with two down-comers, leading to opposite sides of the partition wall in the flue. In each of these down-comers a mushroom shut-off valve is placed, the stems being connected by a cross arm so that as one valve is raised the other is lowered. Thus the gas may be thrown into one or the other flue by shifting the valves or may be divided between the flues by keeping both valves in the half-way position.

The producer houses are of heavy steel frame construction, contiguous with the open-hearth building. The supporting members carry the overhead coal bins and the supports for an overhead runway for the coal conveying larry. The producer foundations are on the ground floor level, which permits ready access to the lower working parts of the producer and gives good drainage for the waste

water. The charging platform is of steel plate partly supported by the producers themselves. It is virtually a second story, being well above the concrete floor, and is about 95 ft. x 27½ ft.

Coal is supplied from overhead bins of 12 tons capacity each. The bins have the form of an inverted pyramid directly over the hoppers of the producers, and terminate in a gate through which the coal falls directly into the charging hopper. The operation of charging consists in swinging open the lid of the charging hopper, filling this hopper with about 200 lb. of crushed coal from the bin, closing the hopper lid, and dumping this charge into the producer. Coal crushed and passed over a ¾-in. screen is supplied to the bins as needed by a larry, which travels on an overhead runway extending from the coal crusher through all the producer houses. It carries about 6 tons at each trip.

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ilar furnaces. Their construction is of the standard type, the covers for the holes being steel castings, brick lined, hydraulically operated, and having a lift of about 3 ft. A platform runs the full length of the pit furnaces on which is located all the apparatus for operating the valves, etc. The reversing valves used were built by the Brier Hill Steel Company from its own designs. The valves are large, water-cooled mushrooms, seating in a water seal. Each side of the furnace has its valves as a separate installation, and each valve has a single function only. The proper sequence of operating the valves is wrought out in the connections of the hydraulic control, so that only two levers are needed for manipulating the eight separate valves.

THE BLOOMING MILL

Taking an ingot 19 x 21 in., weighing 5800 lb., which is as large as good economy in heavy mill practice requires, the blooming mill will deliver a 7½ x 7½-in. bloom in 13 passes. These pieces will be carried through the 7½ x 7½-in. bloom shear (the butts falling into the butt conveyor beneath) to the approach table of the continuous mill. The pieces are reduced in the 24-in. 6-stand continuous mill to 8 x 2-in. and 4 x 4-in. sections, and cropped or cut to the desired length on the intermediate shear, transferred across and delivered to the 24-in. 6-stand merchant mill and reduced to 1½-in. and 2-in. billets and sheet bars, which are run out full length on the shear table and cut into five lengths by a battery of six gang shears cutting simultaneously. The sheet bars are then run out on the inclined table through the pinch roller, delivered to the bar piler and lifted by a crane which deposits them on the cooling beds until ready for shipment. The bar piler is portable and rests on top of the hot bed tables. When rolling billets, it is removed, and the inclined table lowered to a horizontal position, and the billets passed beneath the pinch rollers to the Morgan screw table and then delivered to the cooling beds. The blooming mill has a capacity of 100 tons per hour and the continuous and merchant mills are each designed to take care of this tonnage.

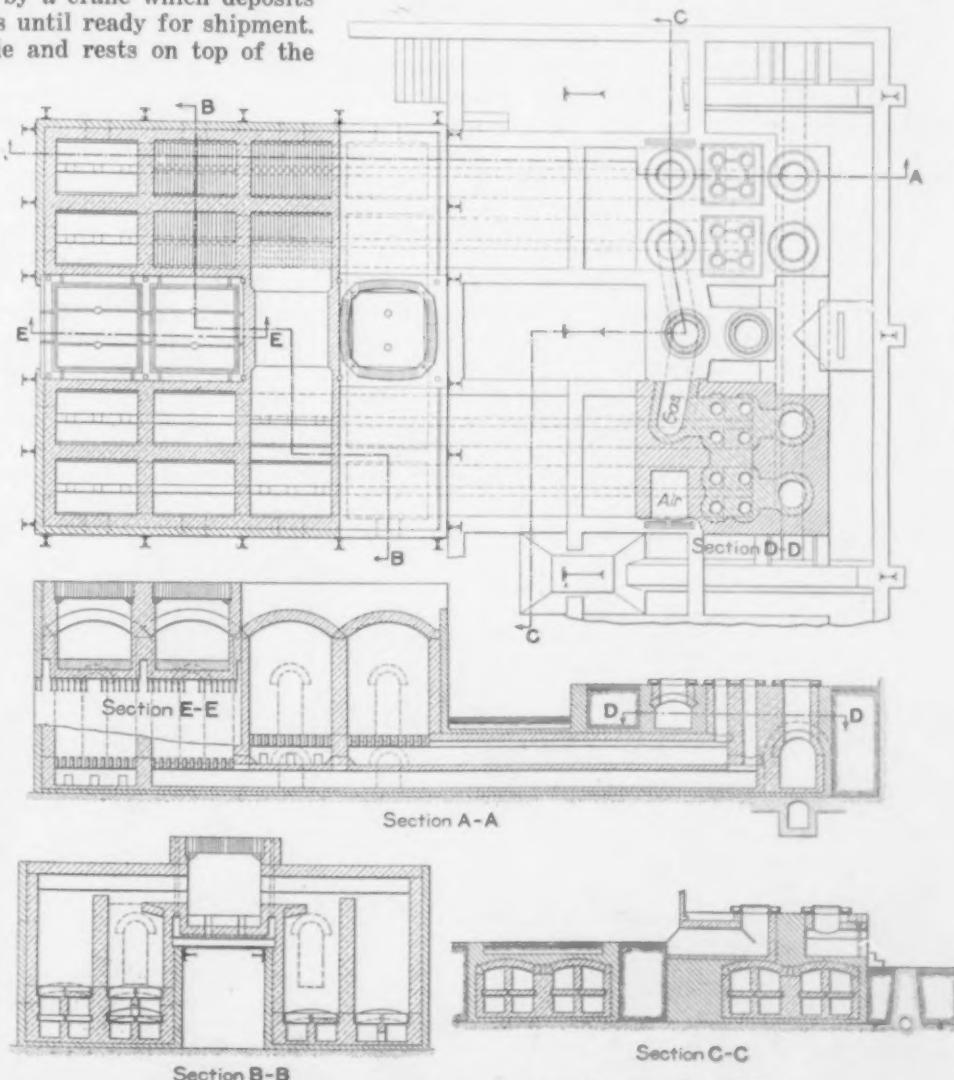
In addition the blooming mill is designed for rolling slabs up to 6 x 30 in. and blooms from 16 in. square down to 4 x 4-in. billets, which are transferred across from the blooming mill run-out table to the shear approach table and sheared to lengths varying from 18 in. to 15 ft. on a 1000-ton steam hydraulic shear from which the billets are run out and kicked off to a conveyor and delivered to special cars for handling them. Small slabs and 4 x 4-

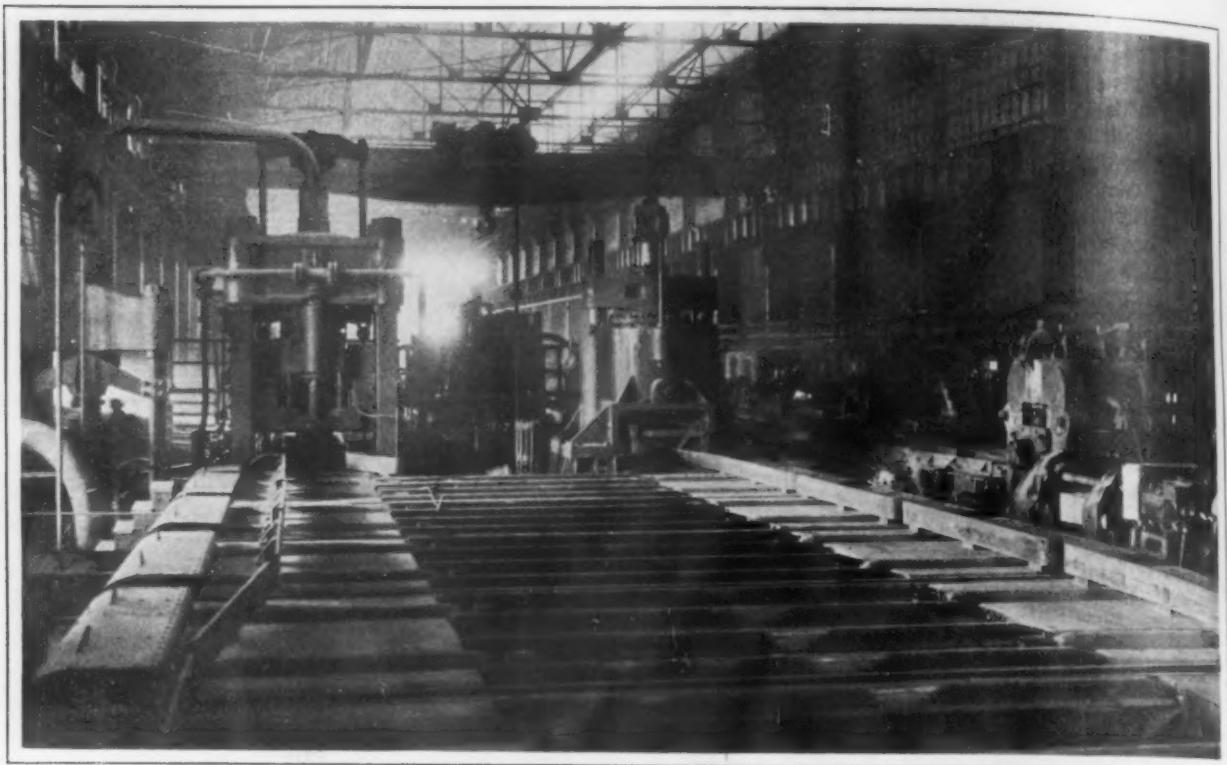
in. billets which are rolled on the 24-in. continuous mill may be run out and transferred across to a 4 x 4-in. hydraulic shear and sheared to lengths of 18 in. to 15 ft. and delivered to cars as at the blooming mill.

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The front and rear mill tables are each 40 ft. long from the center of the mill, each containing 15 cast-steel rollers. The first five rollers on each side of the mill are forced and keyed to forged-steel shafts and the housing or feed rollers are carried loose on forged-steel shafts driven by the table line shafts. The shaft is carried in heavy, brass-lined bearings set in openings in the mill housing, which are large enough to permit of the removal endwise of the feed rollers. The rest of the table rollers are of the same construction as used on the approach table.

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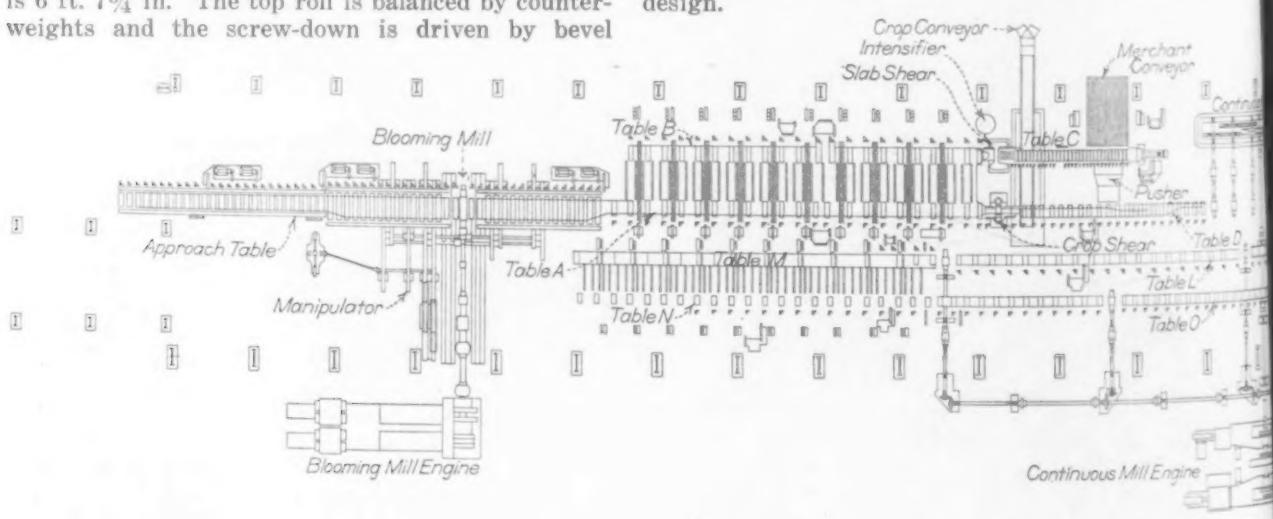
The 1000-ton Slab Shear on Left; 250-ton Crop Shear on Right

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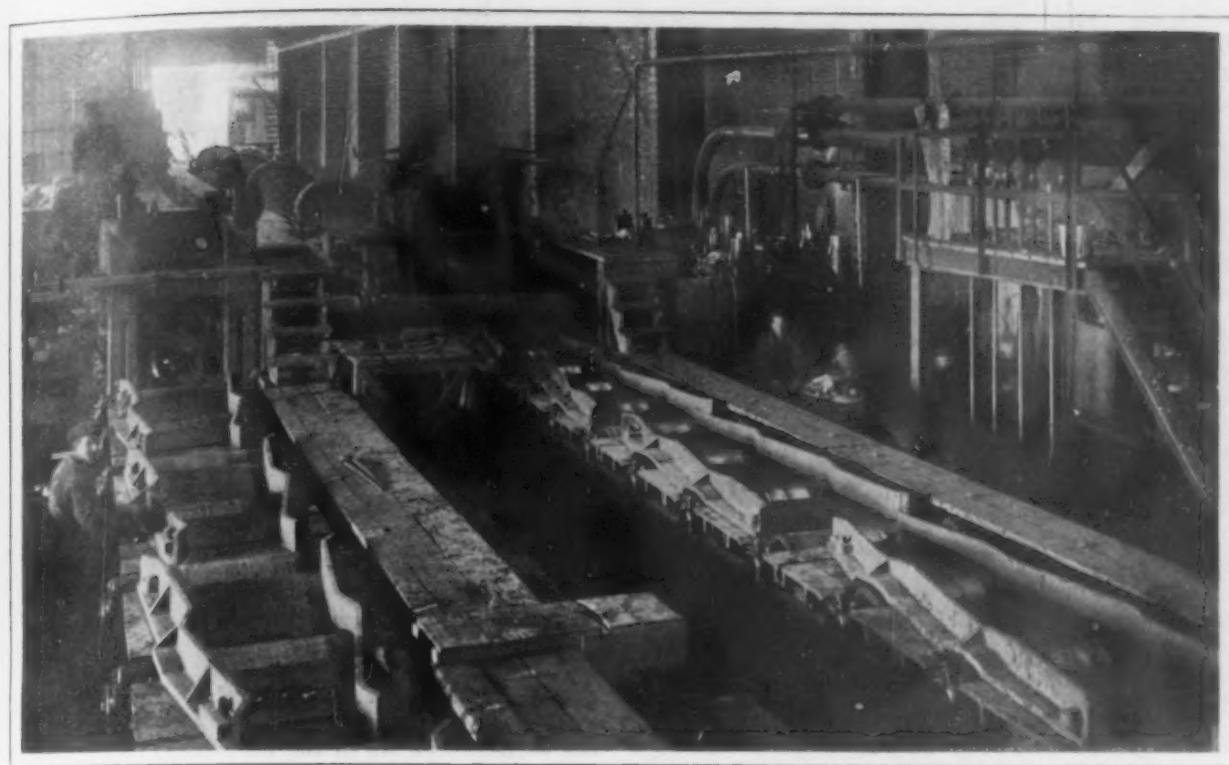
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gears, operated by two 100-hp. motors connected in series so that in case of accident to either motor, the screw-down may be operated by the other motor. The entire driving mechanism, although enclosed in a dust-proof case, is provided with means for complete and continuous lubrication of wearing parts, access for cleaning, and easy removal for repairs. The mill housings are heavy steel castings, weighing 100,000 lb., carried on heavy section cast-iron shoe plates, which are continued across and carry the pinion housing.

The pinion housing is a steel casting of Kennedy design, mounted on the mill shoes and contains two 40-in. nickel-steel pinions, machine cut, with double helical teeth, on a special helical gear planer, planed with not over 1/64-in. back lash. The driving spindle, connecting the bottom pinion to the engine, is a steel forging, 24 in. in diameter, 12 ft. 6 in. long, supported in a spring bearing and provided at both ends with a special flexible coupling of Kennedy design.



Plan of the Blooming Mill and

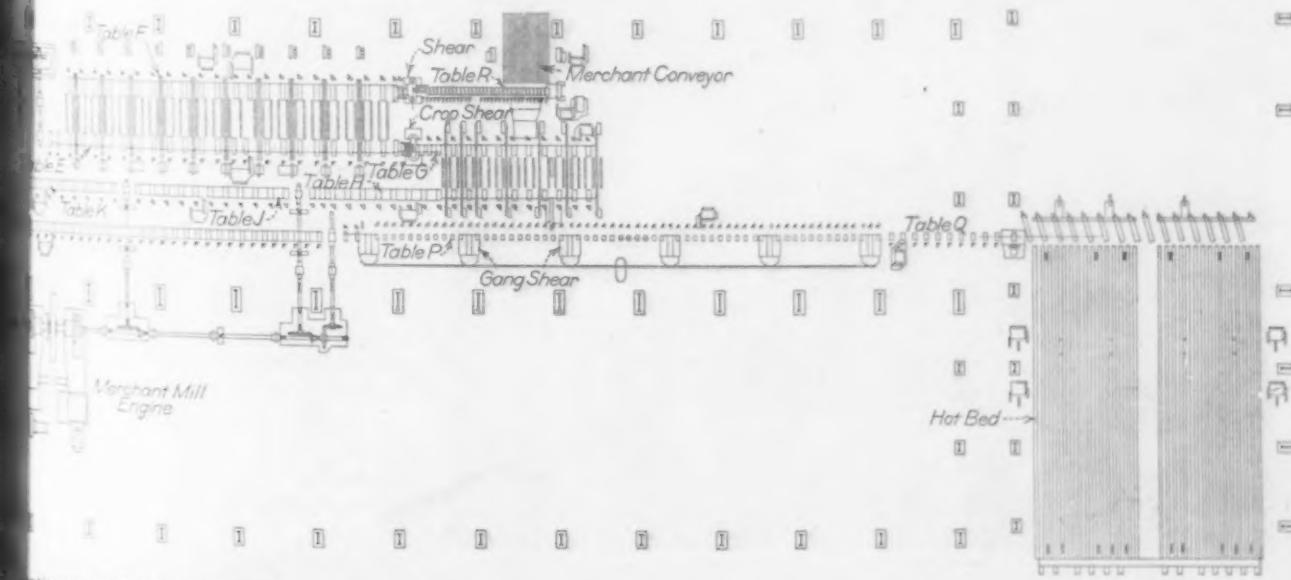


Stands 7 and 12, Merchant Mill, Showing Gang Shears in Background

The shear approach tables are 113 ft. long and contain 25 rollers. They are of usual design driven by a 100-hp. motor and connected by a wire-rope transfer driven by a 50-hp. motor. The slab shear is of the steam hydraulic type operated by an intensifier and is designed for a working pressure of 6000 lb. per square inch with a capacity for cutting 16 x 16-in. blooms or 6 x 30-in. slabs. The intensifier is operated by means of a balanced piston valve controlled by a single lever located in the mill pulpit. One full stroke depresses the shear knife 10 in., which is sufficient for all ordinary work. When cutting thicker pieces, the intensifier makes two strokes, water being admitted for the second stroke by means of a prefill valve. The prefill valve is mounted on the intensifier and forms part of the water connection between the shear and the intensifier. Its object is to admit supply water to the system for changing the stroke of the shear, or for discharging water from the system when it is desired to increase the lift of the knife. Ordinarily the water is simply churned back and forth between

the shear and intensifier. The lever for operating the prefill valve is also located in the mill pulpit, and is only used when it is desired to make two strokes of the intensifier for one stroke of the shear, or for making up for losses due to leakage.

From the slab shear the pieces are run out on to the shear table, driven by a 50-hp. motor. The front end of the table is carried on the slab shear by means of a hydraulic push-back cylinder, and is so arranged that the depression of the table may be adjusted to suit the thickness of pieces being cut. The entire table is supported on rollers and may be drawn back to permit the crop ends to drop through to the conveyor beneath. The shear gauge is carried on two heavy steel bars, the front ends of which are attached to the shear and the back ends being carried on heavy steel girders and stands. The gauge proper is adjustably connected to the shear, so that the stop may be lifted as required by the thickness of piece being cut out. The slabs are pushed off of the table by a motor-operated pusher on to a specially designed reciprocating slab



Continuous and Merchant Mills

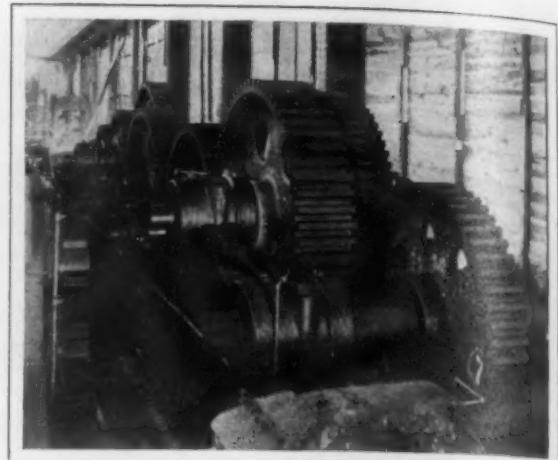
conveyor. This arrangement was adopted in order to keep the conveyor as near horizontal as possible in order to avoid an excessive drop of the pieces into the car.

The crop conveyor which receives the butts from both the crop shear and the slab shear is of the link chain and flight type operated by a 30-hp. motor at a speed of 25 ft. per minute and is of heavy construction throughout. The conveyor trough consists of heavy cast-iron plates supported on a structural steel framework.

Connecting the crop shear with the 24-in. continuous mill is a table 63 ft. long consisting of 23 rollers driven by a 30-hp. motor. This table is provided with collared rollers which automatically turn the blooms 90 deg., and a switch is operated from the mill pulpit, by means of which the pieces may be diverted to either of the two lines of passes in the continuous mill.

THE CONTINUOUS AND MERCHANT MILLS

The continuous mill rolls are 24 in. in diameter by 34 in. long between bearings; the necks are 15 in. in diameter by 17 in. long. The housings are heavy-section air-furnace iron castings connected with a one-piece air-furnace iron cap. The housing screws are provided with locks to prevent the screws from backing off. The bottom bearings are provided with horizontal screws for vertical adjustment. The six stands are driven by a spur gear set contained in a continuous cast-iron bed plate made in three sections, bolted and held together with shrink links, which together with the structural steel gear covers, completely enclose the gears, making it possible to run them in oil. The gears are provided with 5-in. circular-pitch machine-cut teeth. The face of the gears varies from 16 in. to 24 in. Power is transmitted through a 20-in. diameter forged-steel shaft which extends under the mill floor from the 34 and 68 x 60-in. continuous mill engine located in the power house bay. The tables, together with the transfer connecting the continuous mill with the 4 x 4-in. crop and billet shears, is of the same design as the transfer and tables at the blooming mill. The 4 x 4-in. billet shear is a hydraulic down-cut shear and the gauge and shear table are of the same design except that they are of course somewhat lighter in construction.



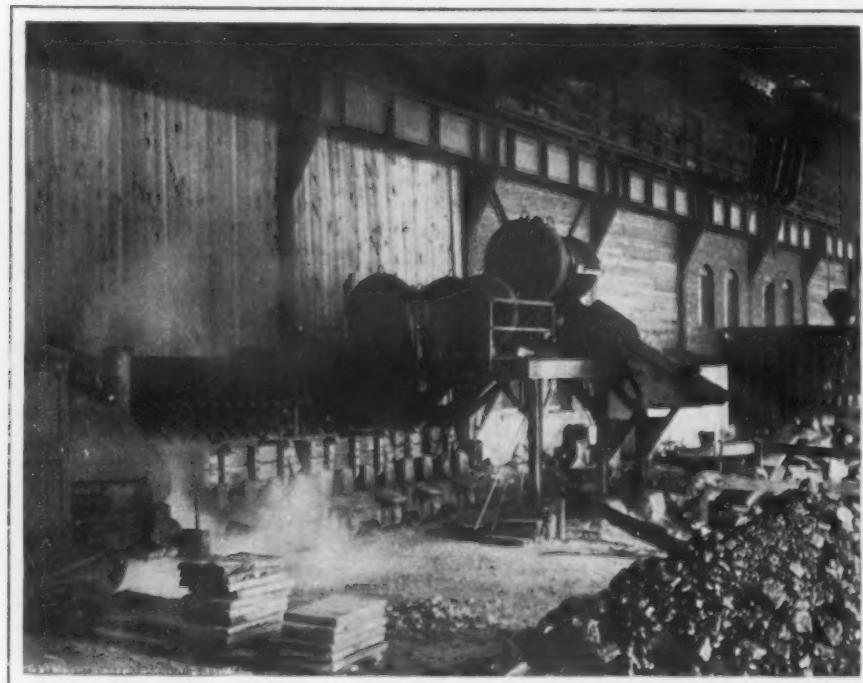
Spur Gear Drive of Continuous Mill, Gear Shields Removed

The 24-in. merchant mill consists of six stands, all of which are two high and arranged so that a piece being rolled will not be operated on by more than one stand of rolls at a time. This is accomplished by having a sufficient space between stands, with roller tables to carry the pieces from one stand to the next. The stands and pinion housings are of the same design as in the continuous mill. These mills are driven by one of the 34 and 68 x 60-in. horizontal cross-compound engines, power being transmitted to the mills by a long shaft and a set of bevel gears for each stand. The gears are 12-in. face, 5-in. circular pitch, with planed cycloidal stub teeth.

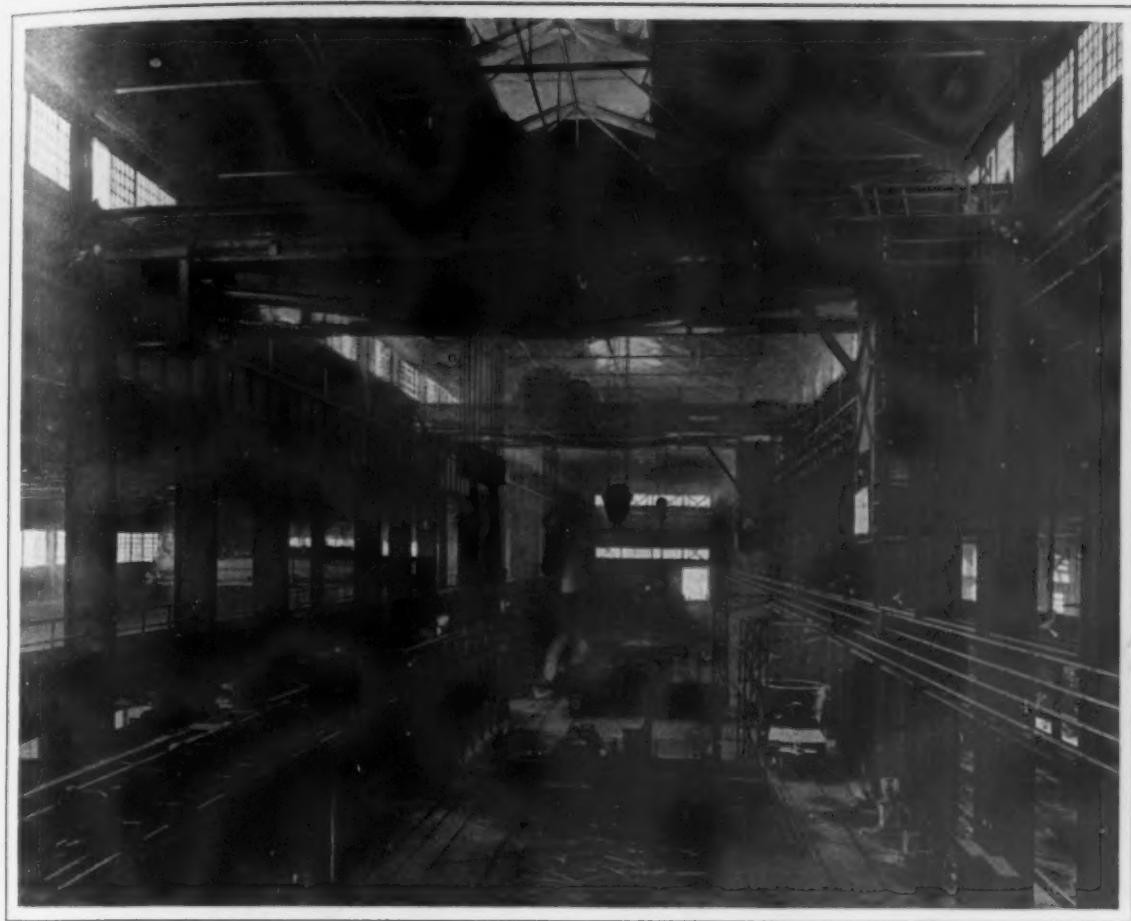
From the intermediate shear the billets are run out on a transfer table 50 ft. long, containing 18 rollers, driven by a 30-hp. motor, and delivered to the approach table by a chain transfer which is operated by a hydraulic cylinder, provided with adjustment by means of which the travel of the transfer may be altered to deposit the piece in line for any one of the several passes on the rolls. The approach table is 82 ft. 6 in. long and contains 20 rollers, driven by a 50-hp. motor. All of the merchant mill tables are of uniform design, provided with cast-iron apron plates, being of the cheek-plate type. The miter gears are steel castings. The roller bearings are bushed on the bottom only, while

the line shaft bearings are bushed top and bottom. After being sheared, the sheet bars go to a weighing table and then to a piler and hot bed furnished by the Morgan Construction Company. The bars are rolled by weight, which is determined by an automatic electrically controlled scale that weighs the full 30-ft. length sheet bars and at once signals the weight to the roller in charge of the finishing task. The hot bed is 55 ft. wide and 90 ft. long. It is served by a Morgan Engineering Company's 15-ton electric crane which loads the finished sheet bars into cars for shipping.

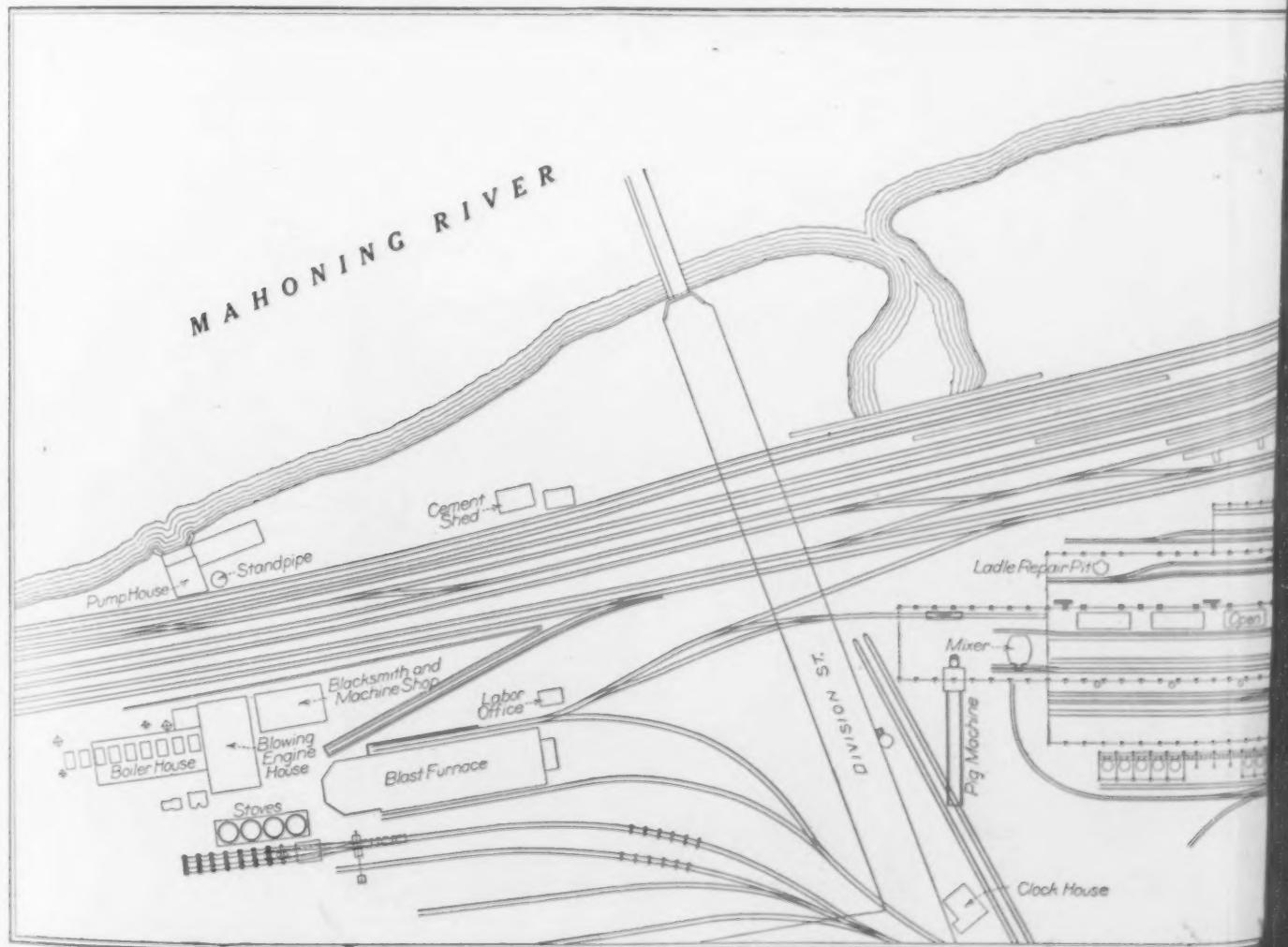
The finished material from the No. 12 stand is run out on the shear table and can be cut in any desired length from 26 to 33 ft. by the battery of six electrically driven up-cut gang shears which are



Crop Conveyor to the Right, Slab Conveyor with Cars and Tray to the Left



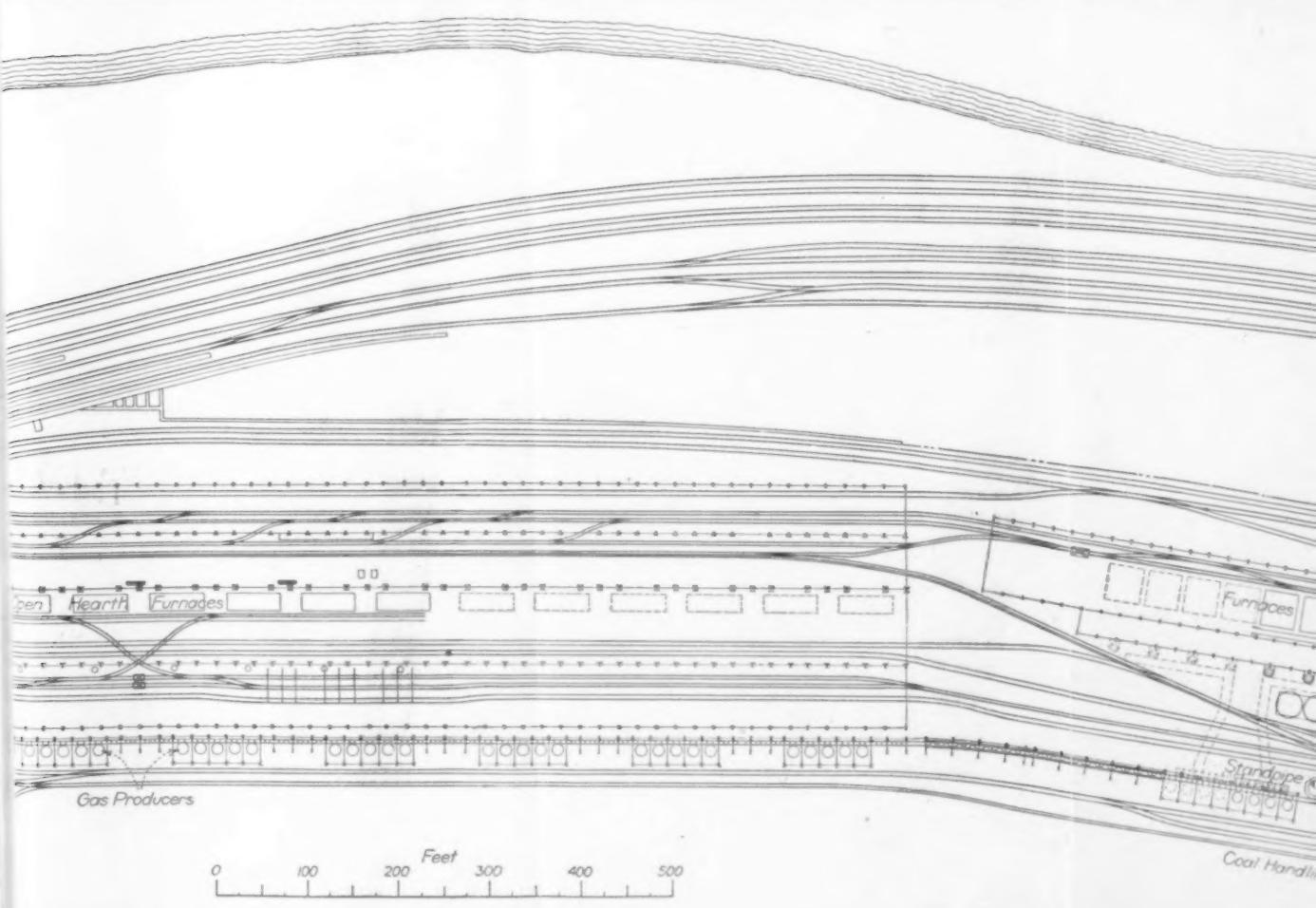
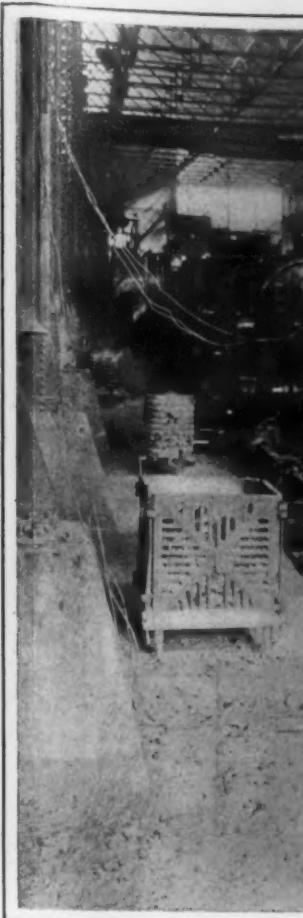
View of the Charging Side of the Open-Hearth Furnaces



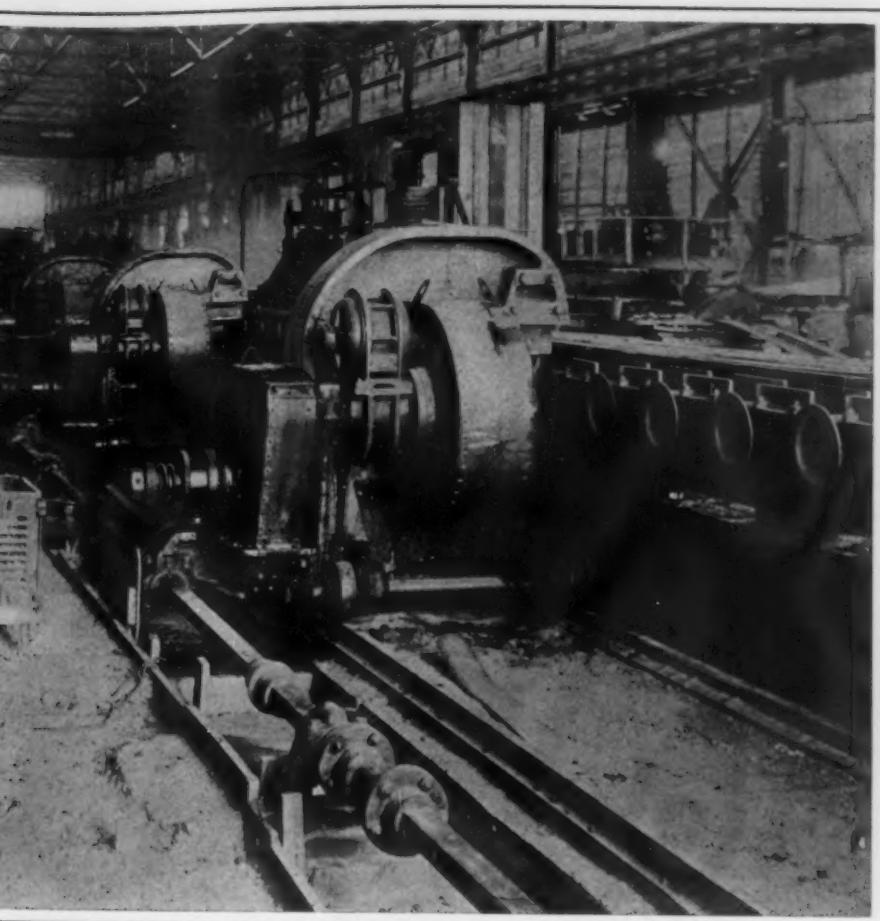
One of the Blast Furnaces, the Open-Hearth



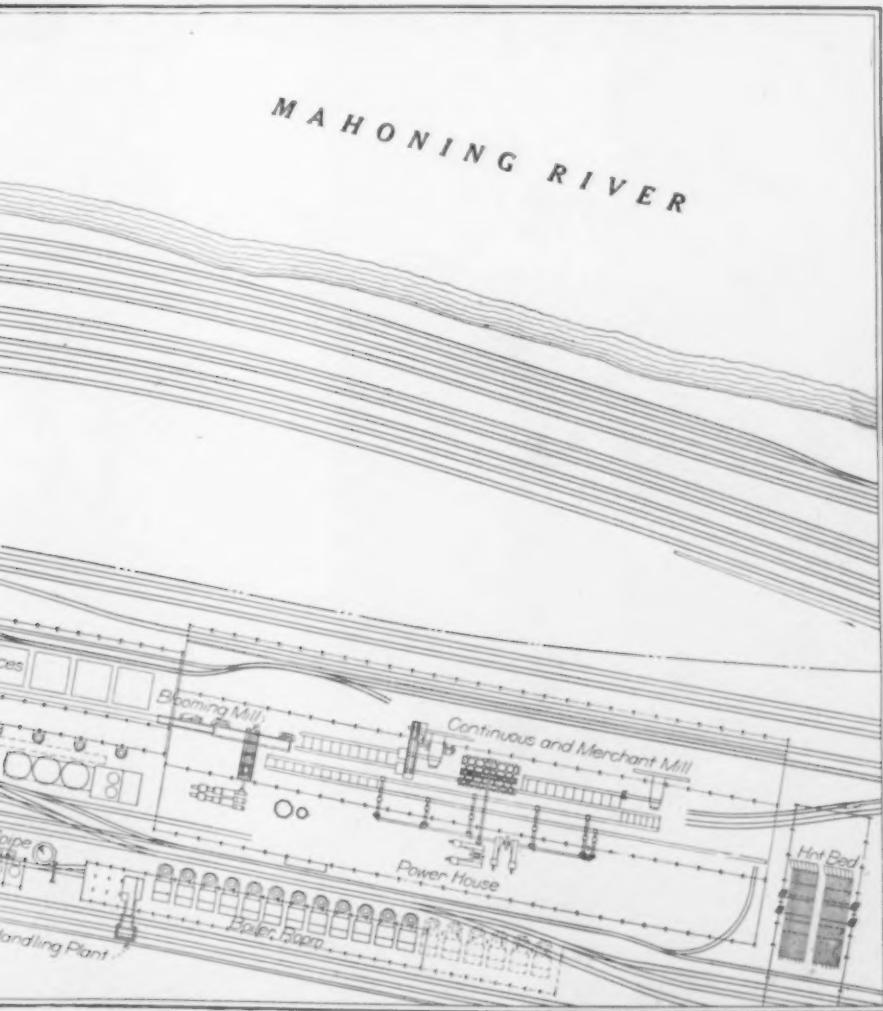
Six-Stand 24-in. Continuous Mill Rolling 4x4-in. Billets and 2x8-in. Slabs



Plant and the Billet, Slab and Sheet Bar Mills of the Brier Hill Steel Company, Youngstown



The Gang Shears for Cutting Each Bar into Desired Lengths



town, Ohio.





The Covered Billet Yard Served by Two 10-ton 65-ft. Span Cranes

mounted on runways to which they are securely clamped when in operation. The housings are one piece heavy steel castings and each shear is driven independently by an induction motor. The shear knives are 18 in. wide and the shear has a capacity for cutting up to 15 x 1-in. bars at a speed of 36 strokes per minute. The motor operates continuously the pinion meshing with a friction gear on the jack shaft, which carries a heavy flywheel. The lower knife head is connected by a cast-steel pitman to the crank shaft. The shear table is of special construction, the rollers being over-hung and in line with the shear knives, the piece being run out from the finishing stand through the guides on the shear. The rollers are provided with collars and grooves in the center to accommodate billets, and are carried in a one-piece casting forming the bearings which is bolted to the table proper. These roller units may be easily detached and shifted to suit the spacing of the shears.

Connecting the shear table with the bar piler is a table 34 ft. long, one end of which is carried on jacks for raising or lowering the table to deliver the pieces through or under the pinch rollers to the cooling beds as previously described.

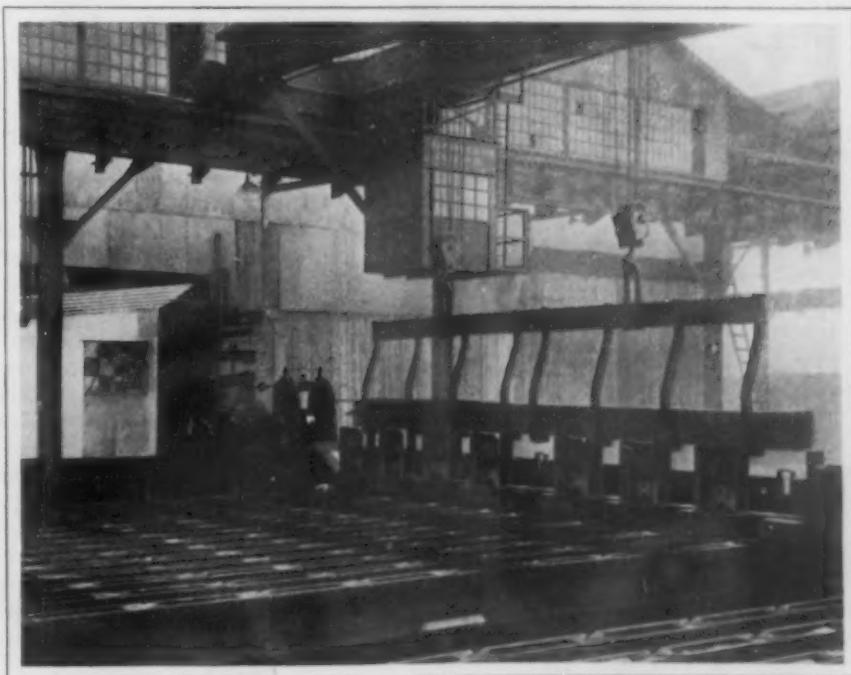
ENGINES, BOILERS AND OTHER EQUIPMENT

The blooming mill engine was designed by Julian Kennedy and built by the William Tod Company. It is aimed to have a minimum center to center distance between cylinders to reduce the twisting tendency and resulting strains in shafts and bed plates common in blooming-mill reversing engines. This arrangement of short distance between center and center of cylinders makes a most rigid and compact construction. The bed plate is cast in one piece and has three bearings. The crank shaft is solid steel forging, hollow bored, with cast-steel counterbalance. It is made symmetrical so that it may be turned end for end if desired. The steam and exhaust valves are located at the top of the cylinder and are driven by the Walschaert valve motion. Both the merchant and continuous mill engines are duplicates with the

exception that the merchant mill engine is connected to the mill on both the high-pressure and low-pressure sides, while the continuous mill engine is connected on the high-pressure side only.

The boiler plant is contained in a steel frame building, 42 ft. wide, 304 ft. long, and located parallel with the blooming mill building. It was installed by the Erie City Iron Works, Erie, Pa., and consists of twelve 500-hp. water-tube boilers equipped with Foster superheaters and Roney stokers and having 60-in. drums and 3-in. tubes. The vertical H columns used for supporting the boiler serve as buck stays and binders for the brick work. The stokers are fed by overhead individual coal hoppers. The feed-water heater for the boilers is of the horizontal open type with shell 10 ft. wide by 30 ft. long, furnished by the Platt Iron Works, Dayton, Ohio. The steam for the feed-water heater is supplied by the exhaust from the blooming mill engine. Two 5-in. horizontal 3-stage Wilson-Snyder centrifugal pumps have been installed in the boiler house, each being driven by 105-hp. Kerr turbine.

The twelve boilers are sectionalized into four groups, three boilers to a section. From the superheater outlets the 6-in. boiler leads are brought together into special manifold fittings from which connections are taken to two main headers in the engine room, as indicated in the accompanying plan showing the piping. A 10-in. U-bend connects the two inside manifolds, so that steam from any boiler can be used at any desired point in the steam lines. Besides the leads to the blooming mill, continuous and merchant mill engines, steam turbines, hydraulic pumps, boiler feed pumps, exciter, etc., a 10-in. line extends across the engine room to the intensifier. There is also a 6-in. line about 2000 ft. long supplying the gas producers. This line is carried on trestle work with V-bends to take care of expansion and contraction in the line. The headers are anchored at two points, A and B. In the 14-in. line leading to the blooming mill engine and the 14-in. line leading to the continuous and merchant mill engines, a receiver separator is installed, having a diameter of about 5 ft. and an overall length of 10 ft. The separators were built to the Crane design. Smaller receiver separators are installed in the two lines for the turbines and the exciter.



Hot Beds, Bar Piler and Hot Bed Crane Receiving Product of the Merchant Mill

S. LIECHLER & SONS.

Mechanical and Civil Engineers,

PITTSBURGH, PA.

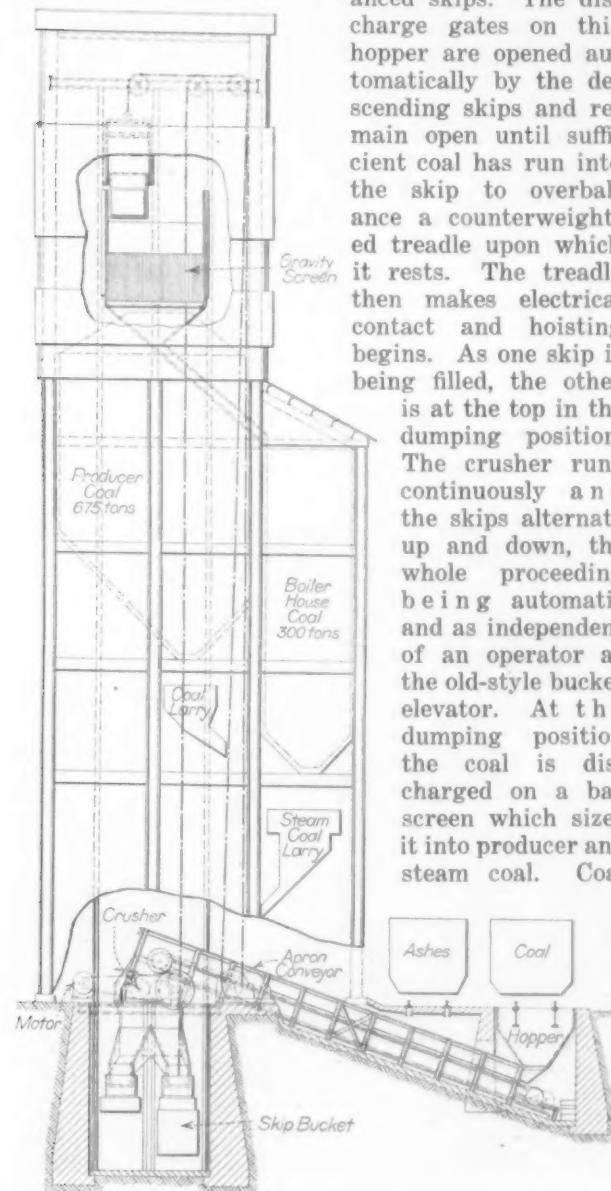
The high-pressure steam lines are designed for 160-lb. pressure and 100-degree superheat. The valves were furnished with cast-steel bodies, bonnets and disks and Monel seat and disk rings and rolled Monel stems. Flanged fittings are cast steel and Kingerit gaskets are used.

The valves of the exhaust lines and low-pressure water lines have Tobin bronze stems and hard-metal trimmings. The boiler-feed lines have ferro-steel valves fitted with hard-metal trimming and Tobin bronze stems, and the flanged fittings are ferrosteel. The pipe is extra heavy genuine wrought iron, fitted with extra heavy malleable-iron screwed flanges.

The hydraulic lines have cast-steel fittings and the faces of flanges are finished to a design of Julian Kennedy. An accompanying drawing shows the detail. A soft-copper gasket 1/16-in. thick is placed between the two male faces, making a joint which has proved effective.

The coal storage bin has one compartment of 675 tons for producer coal and one compartment of 300 tons for boiler house coal. The crushing and elevating plant is designed for a working capacity of 100 tons per hour. Coal received in bottom dump cars is discharged into a 10 x 20-ft. track hopper from which it is fed to a two-roll 30 x 30-in. Cornish tooth crusher. It drops from the crusher into a bifurcated hopper leading to a pair of balanced skips. The discharge gates on this hopper are opened automatically by the descending skips and remain open until sufficient coal has run into the skip to overbalance a counterweighted treadle upon which it rests. The treadle then makes electrical contact and hoisting begins. As one skip is being filled, the other is at the top in the dumping position.

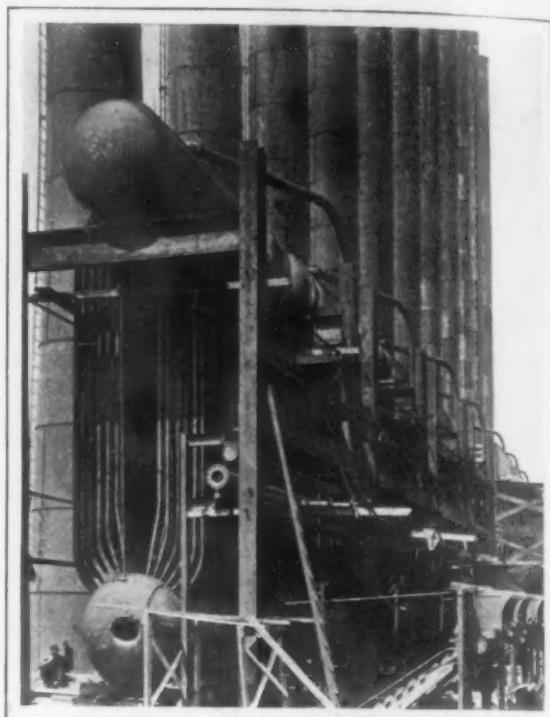
The crusher runs continuously and the skips alternate up and down, the whole proceeding being automatic and as independent of an operator as the old-style bucket elevator. At the dumping position the coal is discharged on a bar screen which sizes it into producer and steam coal. Coal



Heyl & Patterson Coal Crushing, Elevating and Storing Equipment

is distributed to the producers and boilers by specially designed larry cars. This equipment was installed by the Heyl & Patterson Company, Inc., Pittsburgh.

The power house is equipped with two General Electric horizontal high-pressure Curtiss turbo-generators of 1000-kw. capacity, in connection with which Westinghouse-LeBlanc condensers are installed, and also two 750-kw. Westinghouse motor

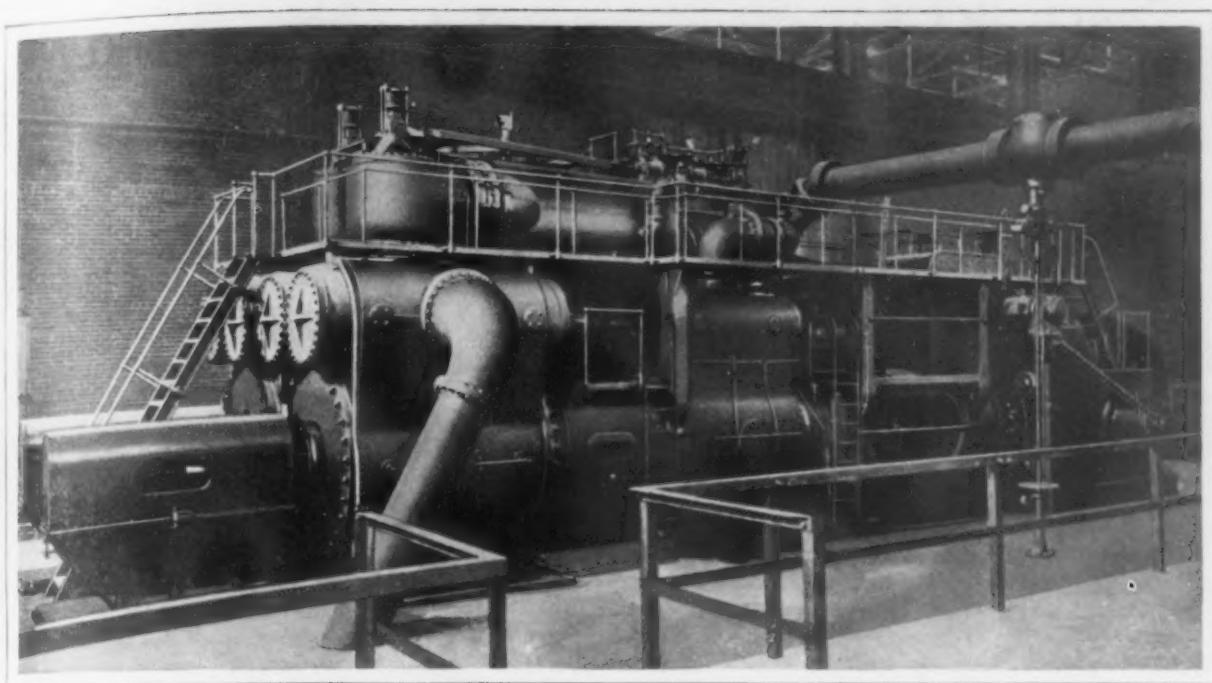


Twelve 500-hp. Boilers in Course of Erection Showing Stokers and Superheaters

generator sets to furnish direct current for the cranes, table motors, etc. The pumping equipment comprises two 16-in. horizontal split-case Worthington centrifugal general service pumps, two 18-in. centrifugal standpipe pumps and one 8-in. feed-water pump. At the west end of the power house are located four roll lathes furnished by the Hyde Park Foundry & Machine Company to take care of roll turning for the entire plant. A water softening plant of the We-fu-go type with a capacity for purifying 1,000,000 gal. of water every 24 hours has been installed.

The company furnishes a complete list of its products, which is as follows: Pig iron, both Bessemer and basic; coke; washed metal for re-carburizing crucible and acid open-hearth steel; open-hearth tin and sheet bars, billets and slabs; black and galvanized steel sheets; uniform colored sheets; corrugated sheets and formed roofing roll, V-crimped, pressed standing seam roofing, etc., and roofing accessories; steel sidings—plain brick, rock-faced brick and stone, beaded and weatherboard; eaves trough, conductor pipe and accessories; metal shingles, four types; metal ceilings; metal lath.

Officers are as follows: W. A. Thomas, president; John Tod, first vice-president; R. C. Steese, vice-president and general manager; J. G. Butler, Jr., vice-president; J. E. Parker, secretary; John Stambaugh, treasurer; H. H. Stambaugh, chairman of the board of directors; E. L. Ford, chairman of the advisory committee; R. B. Shover, general superintendent. Directors: E. L. Ford, H. H. Stambaugh, W. A. Thomas, John Tod, J. B. Butler, Jr., R. C. Steese, John Stambaugh, David Tod, C. G. Thomas.

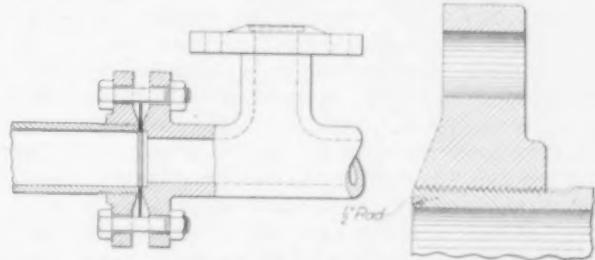


Horizontal Twin-Tandem Compound Tod Reversing Engine, Showing that the Low Pressure Cylinders Are Practically Tangent and That the Engine is Notably Compact

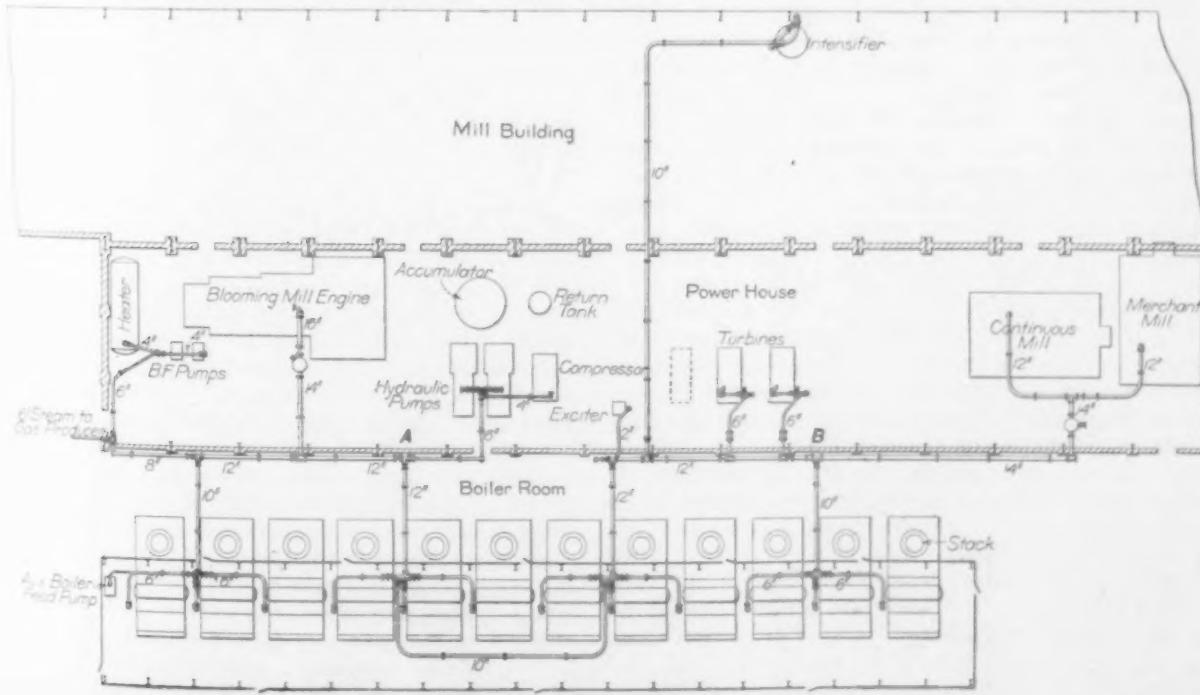
Coke-Oven Gas for Lighting

The rapid strides made by the coke-oven industry in recent years suggest that coke-oven gas may largely displace ordinary coal gas on the grounds of economy. In Germany the distribution of this gas, according to the London Times, has been carried out on a fairly large scale, one of the chief centers of supply being Waldenberg, which provides for the greater part of the Silesian plain by means of long distance transmission systems. At Mulheim the company guarantees a minimum calorific power of 600 B.t.u. per cu. ft., but in this case only that portion of the gas evolved during the most favorable period of carbonization is diverted for the town's use. The town authorities purchase this from the coke company, purify it from H.S., and sell it to consumers at 2s. 9d. (61c.) per 1000 cu. ft., or about four times the amount paid to the company. One of the most notable instances of coke-oven gas replacing coal gas was at Ostend, Belgium. There the municipality about two years ago concluded an agreement with a concessionary company for a supply of gas at a fixed rate of 10½d. (21c.) per 1000 cu. ft.,

and at the same time expressed the intention of demolishing the gas works as soon as the supply was started. In England considerable caution has been displayed in adopting this gas. Middlesbrough has recently made arrangements to take the whole supply of a nearby coke plant. Other instances are Bargoed in South Wales and Little Hulton, near Bolton. The gas seems to lose little of its value in traveling long distances, and in Germany pipe lines of great length have been laid.



Detail of Kennedy Design of Hydraulic Pipe Connections



Plan of the Power Plant Including Mill Engines

The Jobbing Foundry Systematized

Advisability of an Adaptable System to Satisfactorily Operate a Foundry—Observations Regarding "Too Much System"

BY ARTHUR J. HOLMES

One topic that will cause an argument among practical steel foundrymen quicker than almost any other is that of "system." Before launching into an argument, a person must have a full quota of good proofs to follow up every assertion that he may make either for or against a system by which a jobbing foundry may be successfully operated.

The most profitable feature of a jobbing foundry is a system which has for its most salient point "just enough system." On the other hand, there are jobbing foundries producing between 500 and 1000 tons per month which have systems that, instead of using the system to operate the plant, the plant is run for the benefit of the system, and the employees, instead of being able to apply their brains in a way that should bring quick service and satisfaction to a customer, usually spend most of their time disposing of an unnecessary mass of detail and red tape in order to keep their own records in good shape.

Without desiring to criticize any particular one, the assertion may very justly be made that the system agencies of the country work under the mistaken idea that a system which proves highly successful for one plant must necessarily be a success with another foundry, but in actual practice the true state of affairs is exactly the reverse. The system which proves so beneficial to one firm will be a detriment to another. Reasons for this are many and varied, but they may be summed up under equipment, capacity, nature of output, extent of shop-room and the class of help necessary to operate.

One instance with which the writer is familiar was a case where a system agency placed a system in an open-hearth steel plant after installing and successfully operating the same arrangement in a plant whose output consisted only of converter and manganese steels. This agency insisted on the system being installed complete in every detail. After the systematizers had departed it was apparent that everything was not working smoothly. The firm was fortunate in having in its employ several very clever clerks beside a level-headed manager, and after a consultation they decided to dispense with several whole sections of the system. The result was that everything worked out to a very successful method which in general outline is as follows:

THE SYSTEM IN THE OFFICE

When an inquiry is received it, together with the blue-print, is sent to the estimating department, where on a tabulated sheet is placed the estimated weight; the classification, whether good, fair or bad; the number of castings required and the sized flask necessary in the foundry. With this information the inquiry arrives at the foundry desk, where, after being looked over by the foundryman, the estimated time for molding, core-work and cleaning is placed in the spaces designated. With this information the sales department figures an estimated cost, and on this estimate is based the selling price. When the quotation is filed after index and cross-index records have been made, the correspondence file is so arranged that the quotation is

brought forth within a specified time, usually one week, for a "follow-up" letter. When the order is received the quotation is attached and then every-thing is placed in the pending order file to await receipt of the pattern.

Each day as the patterns are received they are carefully examined and given a "symbol." They are first classified according to weight, as for instance any casting estimated to weigh over 4000 lb. is placed in class 1, any casting over 800 up to 4000 lb. is placed in class 2, any casting over 250 up to 800 lb. receives a class 3 designation, and so on down to the smallest pattern received. The second detail is to classify according to kind, as hammer dies in H, gear wheels in G, propellers in P, and so on. Therefore, a gear wheel, even though made with sweeps or segment and core-boxes, the casting of which would weigh 4500 lb., would receive a symbol in C 1—G. In this subdivision there may have already been 28 different gears made for customers, so that this particular gear wheel would receive as its symbol C 129 G. It will be noticed by this that every pattern receives its own separate symbol, which it always retains, even though it may be sent back to the customer, and no other pattern is ever given this same numerical symbol.

The sketcher then makes a drawing of the casting, not the pattern. This sketch is made with a special ink from which may be mimeographed any number of copies, usually about 15 being sufficient. These are distributed to the different files for future use and reference, those placed in the reserve file for the use of the different departments of the shops. The copy retained in the pattern shop has transferred to it a complete record of the pattern and core-boxes. On those filed in the foundry are placed a record of the piecework price in the foundry and a record of the heads, lumps, gates, vents and chills, and in fact anything that might be of use on a subsequent order.

Each day as the patterns arrive a sheet is made out, each pattern receiving an estimated weight and a symbol. At some specified time each day this "Pattern Received" sheet is sent to the order desk in the office. The order clerk removes the order from the pending file, places opposite each item on the original order the shop symbol and estimated weight, and then gives each order a consecutive number. The order bears this number through every detail of the system, and when finally completed is filed away under its own consecutive number. After giving each order for the day its number the order clerk writes up a shop order, this shop order bearing all the information necessary for each department to know to correctly make and ship the castings. This is made in original, duplicate and triplicate. The original copy is for office records only, and always stays in the office. The duplicate goes to the pattern shop, where a symbol tag is placed on the pattern and corresponding core-boxes. This duplicate shop order sheet then has entered on it a complete record of the pattern, consisting of the number of loose pieces, the number of core-boxes, and the number of cores required

from each box. An order to the core shop from this record is made specifying the number of cores to be made from each box. This also proves a valuable record when checking patterns and core-boxes preparatory to returning them to a customer, or when sending them to another foundry. The triplicate copy is a card, which, after having a copy of the sketch for each item as enumerated on the card attached, is sent to the shipping department to be held pending the arrival in the chipping shop of the castings as ordered.

In the office the original copy of the shop order attached to the customer's order with the correspondence is sent to the foundry clerk's desk, where after carefully noting the conditions on which the order was taken, and making himself familiar with the size, shape and nature of the work, he enters the items on the "lay out" schedule, making a promise to the customer which must be consistent with the promise made in the quotation. The original order is then acknowledged with the promise of shipment made to the customer, the order and correspondence going to the billing department to be entered on the price books, from which all the information is taken when the bills are made out following a shipment.

THE REAL BUREAU OF INFORMATION

The original copy of the shop order, with the molding and shipping promises noted thereon, is now sent to the "foundry schedule" desk, where it is entered under its own consecutive order number as previously given by the order clerk. Here on this desk is where the largest part of the detail can either be carried out so thoroughly as to make the system a grand success, or so erratically worked that the other parts of the system do not move nearly so smoothly as they should. The schedule clerk, too, is the one man who should have everything at his finger-ends, so to speak, and who should be able to answer a telephone call, and in not over one minute inform a customer: "Both your castings are in the cleaning department and will be shipped within the next two days." He should be the man to whom should go all the correspondence from customers requesting shipping dates or any information about open orders. On his desk he should have a form to notify the foundry clerk when certain castings have not been molded as promised, requesting an explanation, and a new date, and also a form for the cleaning and shipping department, notifying them two or three days ahead of the date promised to ship that such and such a casting was cast on a certain date, and that the promise to the customer requires that it be shipped on that date, if not possible to do so before, and if for any reason the promise cannot be kept, give the reason for failure and so advise the customer.

THE FOUNDRY END OF THE SYSTEM

The foundry clerk bears the largest responsibility towards the success of the system outside of the office, and he it is who by his clever handling of routine matters, both in the office and the shop, makes himself an indispensable adjunct of any successful foundry. In the first place, he must have a thorough knowledge of the practical end of the foundry business and must combine with that knowledge an adaptability for securing the best results with sometimes the poorest facilities at his disposal. In this he should be the foundry foreman's adviser, the connecting link between the office and the foundry. A practical foundryman once made the assertion that a molder could never be made to do clerical work, and since, according to the writer's experience, this, with a very few exceptions,

is true, it behooves the foundry clerk to be able to accomplish the most work with the least amount of energy expended.

Each day the foundry clerk makes out a "foundry" or "order of work" sheet, using only the order number and the shop symbol, each item or symbol on the sheet having the corresponding sketch bearing the same symbol, placed in the designated rack or pocket of each molder or gang. The sheet is "posted" the last thing in the afternoon, the foundry clerk giving the night foreman a floor sheet designating the size and number of flasks to be placed for each molder or gang and the patterns placed ready for the workmen to start the next morning. This routine, if followed out, relieves the foreman of a lot of worry and incidentally the wasting of perhaps an hour or more, consumed in the actual starting of work for the day, caused by the molders asking for patterns. It is here that a foundry clerk proves his value by being able to so plan the work the afternoon before, perhaps with the assistance of the foundry foreman on one or two special jobs, that the waste of time when the starting whistle blows is cut to a minimum.

Each afternoon just before the molders finish up for the day the foundry clerk takes his copy of the "order of work" sheet and ascertains the amount of work each gang or molder has completed, and from the amount left uncompleted, together with the new work, proceeds to "write up" the sheet for the next day, always with one eye on the promises made to the customers, and the other on the most expedient and at the same time the cheapest way to secure the work in the foundry. From this sheet are checked the molders' time cards, which in turn are entered upon the foundry schedule.

In the foundry, as the molds are finished and before they are sent to the drying ovens, the molders place on the drag of each flask a piece of tin sheeting about 7 x 11 in., bearing in chalk the symbol of the casting. When the flask reaches the assembling or dry floor, and is closed ready for pouring, the tin is placed on the cope from where it is collected as the molds are poured. After each heat is poured these tins are checked and the symbols, together with the order number and the number of pieces of each, are entered on a casting sheet which is sent to the foundry schedule to be entered, a copy being sent to the cleaning shop so that the castings may be checked in this department when received, and any defective immediately reported to the office for replacement. When the castings are shipped and the order completed the shipping card, the triplicate copy of the shop order, is returned to the office, where it is filed with the order under the consecutive number in the "completed" file. The castings are shipped according to symbol, so that the schedule is checked from the shipping sheets, and the invoices rendered without referring again to the original order from the customer.

This system, if carried out faithfully and carefully, entails about the least amount of work to make a thoroughly successful method of keeping track of castings that it is possible to devise. In other words, it has proven itself to be "just enough system" in an open-hearth foundry producing between 500 and 600 tons of miscellaneous locomotive and machinery castings per month.

Vanadium incorporated in rubber by a special process is said to increase the tensile strength of tire stock 200 to 250 per cent. The vanadium is employed as an oxide in the process, which was originated by J. Ellwood Lee, president of the Lee Tire & Rubber Company, Conshohocken, Pa.

ESTABLISHED 1855

THE IRON AGE

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The Need of Railroad Facilities

There are times when light can be thrown upon a difficult problem by studying situations which have occurred in the past and observing what time has since done to them. The people of the United States are confronted with the problem of what is just to the railroads and what is for the best interest of the people in the matter of railroad charges. It is not simply admitted, it is claimed by the majority of those who express opinions in this matter, that much of what is being said is a distortion of the truth. The only difference of opinion is as to who is doing the distorting, whether the railroad managers, the political "demagogues" or the attorneys for the shippers.

We are moved to reflect that while the current thought seems to be that this is a fresh issue, or at least one which is brought strongly to a focus at this present moment, it is really rather an old issue. There are few who will fail to recall that some time ago James J. Hill startled the country by a statement that to keep up with industrial requirements it would be necessary to build 75,000 miles of new road. The date of that statement was January 14, 1907, the occasion a letter to Governor Johnson, of Minnesota, and the period of time for the 75,000 miles of new road five years. This period expired at the end of 1911, three years ago.

That we may start with concrete facts, it may be stated that in the four years 1894 to 1897 inclusive, years of industrial depression, railroad building averaged 1745 miles a year. In the 10 years through 1906, just preceding Mr. Hill's famous statement, railroad building totaled 45,726 miles, or 4573 miles a year. In the seven years following that statement, or through 1913, railroad building amounted to 25,430 miles, or an average of 3633 miles a year. The statistics we follow are those of the Railway Age Gazette.

The point to be made by citing Mr. Hill's statement is not the mere fact that while he claimed that 15,000 miles per year ought to be built for a period of five years, the actual construction has been only 3633 miles a year, or one-fourth as much. It was recognized at the time that the 75,000 miles could not possibly be built. At that time the claim of the railroads had not crystallized into an issue with the Interstate Commerce Commission for an advance in rates calculated to increase the borrowing power of the roads. For several years the rail-

roads had been borrowing heavily and the supply of capital had suddenly run dry, without any definite reason being assigned other than that the supply of capital in general had become limited.

The prominent idea at the time of Mr. Hill's statement was that commerce within the United States promised to grow at such a rate that if 75,000 miles of additional railroad were not provided industry would find itself checked and there would be a plain case of its suffering from lack of transportation facilities. The lesson we ought to learn today from reflection upon this bit of history is that the needs of the future are sometimes overestimated, and badly overestimated. In the discussion which Mr. Hill's statement provoked two divergent opinions became dominant; one that since such a large amount of railroad building was required, the prosecution of the work would produce great prosperity; the other that since the funds could not possibly be found, industry in the United States was going to find itself throttled in a very few years, all for lack of capital with which railroads could be developed.

Neither of these two viewpoints has been found correct. The 75,000 miles of railroad was not built, and industry has not been throttled. We do not want to contemplate what would have been the condition of the railroads today if 75,000 miles of additional road had been financed and built. As having failed of accomplishment, we may dismiss the views of those who expected the construction work to be carried out.

The views of the other party, those who expected industrial growth to be hampered, who expected commerce to be throttled, through a total inadequacy of railroad facilities, may well be considered at this time. What would such a condition produce? It requires no great stretch of imagination to conclude that associations of shippers, chambers of commerce, farmers' organizations, would be sending delegations to Washington to urge upon the Interstate Commerce Commission the necessity of such decisions as would promote railroad expenditures and invite capital to railroading.

There are delegations to Washington, it is true, but the delegations which urge more liberal treatment of the railroads do not come from shippers but from those who desire railroad orders. Instead of shippers or would-be-shippers urging the commission to encourage the flow of capital into railroading the shippers go to Washington to protest against rate advances.

Thus in the retrospect it has become clear that all the views of seven years ago were wrong. The 75,000 miles of new railroad in five years did not become a fact, while on the other hand with 25,000 miles in seven years as the substitute the only industry which raises a claim of suffering is the equipment industry. It is hardly possible that in seven years our vision has become so clear that it is impossible for any of us to make a mistake in the present issue as to the railroads. As a matter of fact it is clear that some men are making a mistake since the present controversy has developed such extremely divergent views. In the light of history, the balance of probability is that the truth lies somewhere between—that all the contestants in this debate are at fault in some degree. It is well to reflect, too, that the passing years do not deal so harshly or summarily with these apparently crucial situations as is usually assumed. Neither the railroads nor the shippers are really hanging by the eyelids at the moment.

The Proposed Trade Commission

Approaching the dignity and force of a State document is the report made by the special committee appointed recently by the Chamber of Commerce of New York City to study the anti-trust legislation pending before Congress. The committee especially opposes the project of an Interstate Trade Commission, asserting that "the seeming implication that all corporate forms of enterprise are necessarily under the suspicion of being conducted in contravention of law and public welfare and should therefore be brought under the closest scrutiny of a Government trade commission is a new pronouncement of startling portent." It is pointed out that this scrutiny of the business conducted under corporate form is to be made by a commission which has practically no other powers than those of investigation. With cogent force the report makes this reference to those who are endeavoring to bring about the creation of such a commission:

It is, indeed, a serious matter when the framers of legislation, being the elected representatives of the people in Congress, should seem to indicate that in their minds all those conducting industrial enterprises are less honest, less fair and less public-spirited than those who are drawn into public life to frame and administer the laws. If business men of the country do not generally resent and protest against such implications, they will be considered to have tacitly admitted them.

The following extract from the committee's report also presents some facts with regard to achievements by individuals which are most admirable:

A survey of the history of the remarkable industrial and business development of this country indicates that its achievements have been, in the main, due to the initiative, energy, enterprise, and bold courage of an immense number of individuals breathing and operating in the free air of untrammeled opportunity, in which alone true genius can work and survive.

The spirit of unrest has been said to largely spring not alone from unequal conditions of life, but from what has been called the unequal distribution of wealth. Undoubtedly what has been meant is the unequal acquisition of wealth, but there will always be unequal acquisition of wealth as long as there is unequal distribution of brains, industry, and thrift, and these are qualities of mind and character which no statutory laws can regulate or control, but the beneficent exercise of which unwise law can greatly restrict and discourage.

The report recommends that President Wilson and Congress be urged to allow ample time for discussion of the several anti-trust bills by the people of the country before they are put to a vote. This is a pertinent suggestion. So far the effort to mold these bills into proper form has not resulted in the production of measures satisfactory to the advocates of this class of legislation. It would seem, therefore, that sufficient time should be given for the people of the country generally to study the plans proposed and make their conclusions heard by their representatives in Congress.

Our Pig-Iron Trade with Canada

The new cross currents which the reductions in iron and steel tariffs will introduce in our foreign trade statistics are illustrated by the impending increase in our pig iron imports from Canada. Should the shipments of Dominion Iron & Steel Company pig iron to the United States this year be only the 20,000 tons already sold to New England and Delaware River foundries, the 1914 total will be several times the average of our imports from Canada in recent years. At 1976 tons in 1908, with slight increases in the interim, the total being 4609 tons in 1913, Canadian pig iron shipments to us have been generally reckoned as principally electrolytic ferrosilicon produced at Welland. The shipment of Nova Scotia pig iron into the United States is especially noteworthy in view of the heavy exports of pig iron from this side of the line into Canada, chiefly to Ontario, these reaching 193,396 tons in 1913 and being at a maximum of 208,581 tons in 1912, as against only 44,758 tons in 1909. The large figures for 1912 and 1913 tell of the boom across the border that has now given way to marked recession.

That foundry pig iron shipments should be going in both directions between Canada and the United States, as at present, is not only a result of the new tariff, but a phenomenon of the far-extended territorial contacts of the two countries. Even with Canada's duty of \$2.50 on pig iron, Buffalo district furnaces command a trade of 200,000 tons there as against the Nova Scotia furnaces now invading our Eastern seaboard.

It should not be overlooked that the appearance of Dominion pig iron in our Eastern markets is really one of the signals of the distress under which Canadian industries are laboring lately, in common with our own. Normally the Dominion Iron & Steel Company's pig iron will all be needed by its steel works, and it is a most exceptional condition that prompts the marketing by the company of anything but semi-finished or finished steel.

Analysis of Grinding Wheel Accidents

The Independence Inspection Bureau of Philadelphia has compiled a chart which analyzes in great detail the causes of accidents to abrasive wheels. The facts as set forth should be of vital interest to users of grinding machinery. While the intelligent use of wheels is increasing rapidly, largely because of the educational work carried on by some of the manufacturers, a great deal of ig-

norance still exists. When a rapidly running wheel breaks, the chance of serious injury to workmen is large, even if the wheel be guarded, though a few of the guards afford a high degree of protection. In only a small percentage of accidents can blame be laid at the door of the maker. The wheels are tested at high speeds before they leave the plant of the maker and the factor of safety is large. The causes are generally to be found in the works where they are used.

According to the findings of the bureau above named, broken wheels are caused by cracks resulting from such causes as dropping or striking against some object while not being operated; by being forced on an improper-sized spindle; by a heated spindle; by tightening of the nut; by too high rim speed; by catching work between rest and wheel; by being out of true; by the wheel being unbalanced—and details are given under each of these headings and various others. The flying wheel unbroken is discussed particularly, also flying particles, inhaled or in the eye.

The analytical table is prepared for general distribution, and has already received much favorable comment from manufacturers of wheels who have examined it. Many thousands of men employed in managerial positions or as artisans should secure it and give it close study, after which a careful inspection of the grinding equipment in the works and the methods employed in operating it would show in not a few cases that safe practice has been violated.

THE WORCESTER CONVENTIONS

An Innovation in the Annual Metal Trades Gatherings

The conventions of the National Metal Trades Association and the National Machine Tool Builders' Association at Worcester, one following the other immediately, in the week beginning April 20, will be unique in the history of these organizations, not only because they will come practically together, but because the meeting place is one of the smaller cities. It will be an interesting experiment. The dual meeting is in a sense accidental. The Machine Tool Builders had planned to meet a month later in New York, but the fact that the associations have so many members in common made it seem expedient this year to permit manufacturers to combine the conventions in one trip. Some 75 of the 170 machine tool builders, each a manufacturing house, are members of the Metal Trades Association.

Practically the only reason for taking the Metal Trades convention away from one of the largest cities was that the members would have fewer distracting influences and would naturally attend more closely to the business in hand.

The two organizations named are splendidly representative of the metal industries. Those of the members who come from central and western districts will find much of interest in a typical New England manufacturing center, a city of moderate size, and industrially an old one. Some of Worcester's older manufacturing enterprises have fallen away, others have grown to great proportions through a succession of progressive managements, and still others are of recent foundation and are thriving infants. Occasionally one hears that the New England territory is falling into decay from a

manufacturing standpoint. It will be found that this is not the case in the metal trades, at least, though it must be said also that many successful Western men have an aggressiveness which is sometimes missing in the older centers of the East. It is announced that the visitors will have the entree to various modern plants. By thus meeting the Worcester manufacturers in their own bailiwick, the guests should leave some of their own atmosphere behind them, and perhaps take back home with them a little of what they occasionally term "New England conservatism."

It has been suggested from time to time that these great associations in metal working lines should hold their conventions in different parts of the country. It has been common opinion that New York is the logical convention place, because the greatest attendances are attracted thither, and similarly Chicago has drawn large numbers. It might be well if the Eastern members of the two associations made more convention journeys westward. The foundrymen have found such changes of scene highly profitable and doubtless the Worcester experiment will have an important influence in determining future policy in this regard.

The Falling Off in Steel Exports

WASHINGTON, D. C., April 1, 1914.—The falling off of approximately one-third in the value of iron and steel manufactures exported in January, compared with the corresponding month of the preceding year, and of more than one-half in tonnage of most forms of iron and steel, is an intensification of the dominant movement in the exports of iron and steel products in the last half year. In July, 1913, there was a fall of a half million dollars in value; in August, a million and a half; in September, a little less than one million; in October, a very slight decline; in November, a fall of six and a quarter millions; in December, about one million, and in January, eight and a half million dollars. This decline seems to be very general, both as to classes of products and the countries of destination. A very large proportion of the nearly 100 articles of iron and steel enumerated by the Department of Commerce in its export statement show a falling off in the exports of January, 1914, when compared with January, 1913.

The falling off in exports of manufactures of iron and steel in January is apparently a part of the general decline in exports of manufactures. The general group "manufactures for further use in manufacturing" shows a fall of \$5,000,000 in January, 1914, when compared with January, 1913, while the group "manufactures ready for consumption" shows a fall of \$12,000,000, making the total falling off in exports of manufactures in January, 1914, \$17,000,000, of which about \$8,000,000 occurs in iron and steel manufactures.

The fall occurs in exports to practically all parts of the world, but is more sharply marked in the movements to Canada, Mexico, Cuba, South America and Australia than elsewhere. The Department of Commerce shows in its monthly publication the countries of destination for a comparatively small number of articles, but in most of these the fall is widely distributed. Billets, ingots and blooms, for instance, show a fall from 18,000 tons in January, 1913, to less than 3000 tons in January of this year, and 8000 tons of the decline is in the movement to the United Kingdom, while about 5000 tons is found in the movement to Canada. Locomotives show a decline from 60 in January, 1913, to 28 in 1914, the loss in the exports to Canada being 4, to Brazil 6, to Cuba 5, to Mexico 3 and to Japan 23. The decline in metal working machinery was from \$1,402,563 to \$966,545 and about \$125,000 of the \$436,000 falling off is in the movement to Canada. In steel rails the falling off is from 35,695 tons to 17,620 tons and this occurs in the movement to Australia, South America, Mexico, Central America, the West Indies and Canada. The exports of structural steel to Canada

fell off from 22,058 gross tons to 8105 tons. In tin plates there was a falling off of over 50 per cent., and this occurred generally in the movement to Canada and in a less degree to Argentina, Brazil and India. In wire there is a fall from 38,000,000 lb. in January, 1913, to 22,500,000 lb. in January of this year. This occurs generally in the movement to British Oceania (Australia and New Zealand), Argentina, Brazil and Canada. By far the largest fall, however, occurred in British Oceania, the exports for January, 1913, being 10,492,000 lb. and in January of this year 213,000 lb.

Machinery Demonstrations in Cleveland

The value of demonstrations of machines in operation on the floors of dealers' storerooms in increasing sales is well recognized by machine-tool builders. Such demonstrations, more often of individual machines or the line of one maker, are not infrequent, but one recently given by the Motch & Merryweather Machinery Company, Cleveland, Ohio, was noteworthy from the fact that it was on an exceptionally elaborate scale and attracted an unusually large number of spectators. The demonstration was held in the evening so that men who wished to attend were not prevented from their work by so doing. Invitations of a blanket form had been sent to various factories, requesting the attendance of anybody about the plant who might be interested. The number present exceeded all expectations, reaching about 450. A large number of shop men, in addition to plant managers, superintendents and foremen, were in attendance. The plant of one automobile manufacturer was represented by about 100 men, the greater part of these being shop men. The demonstration included the operation of various types of machinery, such as milling machines, lathes, planers, boring mills, high speed and radial drills, all in the hands of experienced operators.

It was the aim to make the demonstration broader than a mere exploitation of the merits of particular machines, in order that it would be of considerable educational value to the spectators. Carrying out this idea, an instructive stereopticon talk on milling machines, cutters, jigs and fixtures, on which the subject of milling machine practice was gone into at some length, was given by C. H. Baker, Cincinnati Milling Machine Company. Various points in connection with the operation of machines were explained and numerous questions were answered. So much interest was taken in the demonstration that the guests did not leave until 11 o'clock and some came back the next day for additional information.

An exhibit and demonstration of machinery was also held by the Cleveland Tool & Supply Company during the entire week ended March 28. The demonstrations made included drilling tests with the Cleveland Twist Drill Company's drills, the Wahlstrom Tool Company's automatic chuck and the Barnes Drill Company's high-duty all-gearied drill. This exhibit attracted a large number of spectators.

New Iron and Steel Institute Members

The following have just been elected to membership in the American Iron and Steel Institute:

Active Members

George L. Danforth, superintendent open-hearth departments, Illinois Steel Company, South Chicago, Ill.

Tristen P. Draper, assistant superintendent blast furnace and steel departments, Youngstown Sheet & Tube Company, Youngstown, Ohio.

William B. Gillies, superintendent Bessemer department, Illinois Steel Company, South Chicago, Ill.

Joshua B. Lessig, secretary and treasurer George B. Lessig Company, Pottstown, Pa.

Arthur E. Woolsey, general manager Tata Iron & Steel Company, Sakchi, India.

Associate Members

Samuel E. Hackett, purchasing agent Joseph T. Ryerson & Son, Chicago.

Donald M. Ryerson, vice-president Joseph T. Ryerson & Son, Chicago.

Edward L. Ryerson, Jr., vice-president Joseph T. Ryerson & Son, Chicago.

Louis Wilputte, vice-president and general manager Otto Coking Company, New York.

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Iron and Steel Association Retains Charter

The Eastern Iron and Steel Merchants' Association, Philadelphia, held a meeting March 26 at which it was determined that the life of the organization should be continued. The meeting was the first held in eight years and its president, Frank Samuel, Harrison building, Philadelphia, in calling the meeting to order stated that there was an unexpended balance in the treasury. It was decided that the association could perform a useful service as a vehicle for the joint consideration of trade problems and betterments and that the charter should be retained. Mr. Samuel resigned as president and V. L. Phillips, F. R. Phillips & Sons Company, was elected in his place. Present at the meeting were representatives of the following members: Plitt & Co., E. B. Leaf Company, F. R. Phillips & Sons Company, Charles Dreifus Company, Henry A. Hitner's Sons Company and Girard Iron & Metal Company.

The National Scale Company, Chicopee, Mass., is building nine standard sizes of National-Chapman elevating trucks for transporting so-called tote boxes and other industrial uses. The height of the truck raised varies from 7% to 10% in., and the clearance between the side bar and the floor is between 2 1/2 and 4% in. The extreme length of the truck in its raised position is either 50 or 51 in., while the width ranges from 17 to 30 in. The capacity is from 2000 to 4000 lb.

The Iron and Metal Market

DEMAND AT LOW EBB

Further Weakness in Finished Products

Second Quarter Shipments on Contracts Are at First Quarter Prices

The prominence given to the heavy reductions of railroad train, shop and track forces has intensified the unfavorable sentiment in the steel trade and comparisons with the low ebb of demand in November and December are more common. The suggestion of the close sequence of the excellent buying in January does not get so much attention. What stands out is that the season of outdoor work has come and many buyers of iron and steel are acting as though they would never need to buy again. That there may be a sudden change from this attitude is recognized, but such a change is not in sight.

The state of mind of the entire trade is seen in the growing belief that more than a railroad rate advance is needed to give the steel mills work enough to run full.

The beginning of the second quarter of the year has developed this much as to prices of plates, shapes and bars: On contracts calling for \$1 more on shipments in this quarter than has lately been paid, shipments will be made at first quarter prices. The tendency is to even lower prices than on some first quarter contracts. Some recent sales in all three lines were made as low as 1.15c., Pittsburgh, and on plates from 50c. to \$1 a ton below this basis has been done on Eastern business. At the same time considerable shipments of bars and shapes are being made at 1.20c.

The market seems to be shaping for a return of the conditions in January, when buyers tried to make contracts at 1.05c. and 1.10c. but could not, and the mills sold for only three months ahead, generally at 1.15c. to 1.20c.

Trouble with coal miners in the Pittsburgh district was averted on the eve of April 1 by a renewal of the old scale for two years, but the iron trade had not seriously considered the possibility of a strike there. In Ohio the coal output will be heavily cut down as many mines will be closed while the law is tested which requires mine-run weighing. Iron and steel works operation will not be affected, but the opening of lake navigation will be late, with the restriction of coal traffic.

One car shop in the Pittsburgh district is idle in all departments except those on passenger cars and the plate mills are feeling more acutely than for a long time the falling off in their business. About 11,000 freight cars are under inquiry and it is estimated about 35,000 were placed in the first quarter of the year. The Union Pacific has just given an order for 54 locomotives.

Canadian buying in this market has fallen off considerably from that of 1913, especially in railroad material. A recent inquiry is for 3000 to 4000 tons of plates and shapes for the vessel placed by the government with the Canadian Vickers shipyard at Montreal.

In the lighter products conditions have changed but little. Wire specifications were less than expected in March, but there is better promise for April. Tin plate contracts are being rapidly turned

into actual orders. In sheets there is further shading of prices, but roofing sheets are more active.

The weaker tendencies in finished steel have not helped Central Western steel works in the effort to establish \$22 and \$23 respectively on billet and sheet bar contracts for the second quarter. Actual sales have been \$1 or more under these figures.

Pig-iron markets have rarely come so near to a standstill. Southern iron is lower and \$10.50 is reappearing as the prompt price for No. 2 foundry iron at Birmingham. But even at the advances Northern furnaces have tried to establish, they can undersell the Southern product in the Lake districts.

The average price of Bessemer pig iron in March, as reported by W. P. Snyder & Co., Pittsburgh, was \$14.166 against \$14.225 in February, and of basic iron, \$13.041, against \$13.059 in February—all prices at Valley furnace.

The city of Cleveland is opening bids this week on 8500 tons of pipe and Detroit has placed a contract for 10,000 tons with a local plant.

British and Continental markets show sharp competition in the plate and structural trades. The Clyde shipbuilding returns for March—a total of 27,400 tons built—are the smallest since 1909. British blast furnaces active are now but 171, as compared with 206 one year ago.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

	At date, one week, one month, and one year previous	Apr. 1, Mar. 25, Mar. 4, Apr. 2,
Pig Iron, Per Gross Ton:	1914.	1914. 1913.
No. 2 X, Philadelphia...	\$15.00	\$15.00 \$15.00 \$17.75
No. 2, Valley furnace...	13.25	13.25 13.25 16.00
No. 2 Southern, Cin'ti...	13.75	14.00 14.00 16.25
No. 2, Birmingham, Ala...	10.50	10.75 10.75 13.00
No. 2, furnace, Chicago*	14.25	14.25 14.25 17.25
Basic, del'd, eastern Pa...	14.25	14.25 14.50 17.00
Basic, Valley furnace...	13.00	13.00 13.00 16.00
Bessemer, Pittsburgh...	14.90	14.90 15.15 17.90
Malleable Bess., Ch'go*	14.25	14.25 14.25 17.25
Gray forge, Pittsburgh...	13.65	13.65 13.65 16.75
L. S. charcoal, Chicago...	15.25	15.25 15.25 18.00

	Billets, etc., Per Gross Ton:	21.00	21.00	21.00	28.50
Bess. billets, Pittsburgh...	21.00	21.00	21.00	29.00	
O-h. billets, Pittsburgh...	21.00	21.00	22.00	29.50	
O-h. sheet bars, P'gh...	22.00	22.00	25.00	36.00	
Forging billets, base, P'gh...	25.00	25.00	25.00	30.00	
O-h. billets, Phila....	23.40	23.40	23.40	30.00	
Wire rods, Pittsburgh...	26.00	26.50	26.50	30.00	

	Old Material, Per Gross Ton:	12.75	12.75	13.00	16.25
Iron rails, Chicago.....	12.75	12.75	13.00	16.25	
Iron rails, Philadelphia...	16.50	16.50	16.50	18.00	
Carwheels, Chicago	11.75	11.75	12.25	16.75	
Carwheels, Philadelphia...	12.00	12.25	12.75	15.00	
Heavy steel scrap, P'gh...	12.00	12.00	12.25	14.25	
Heavy steel scrap, Phila...	11.00	11.00	11.50	13.75	
Heavy steel scrap, Ch'go...	9.75	9.75	10.00	12.50	
No. 1 cast, Pittsburgh...	11.50	11.50	11.75	14.25	
No. 1 cast, Philadelphia...	13.00	13.00	13.00	14.00	
No. 1 cast, Ch'go (net ton)	10.25	10.25	10.50	12.50	

	Finished Iron and Steel,	Cents.	Cents.	Cents.	Cents.
Per Lb. to Large Buyers:					
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25	1.25
Iron bars, Philadelphia...	1.22 1/2	1.22 1/2	1.27 1/2	1.67 1/2	
Iron bars, Pittsburgh...	1.35	1.35	1.40	1.70	
Iron bars, Chicago.....	1.17 1/2	1.15	1.12 1/2	1.57 1/2	
Steel bars, Pittsburgh...	1.15	1.20	1.20	1.85	
Steel bars, New York...	1.31	1.36	1.36	2.01	
Tank plates, Pittsburgh...	1.15	1.15	1.20	1.70	
Tank plates, New York...	1.31	1.31	1.36	1.76	
Beams, etc., Pittsburgh...	1.15	1.15	1.20	1.70	
Beams, etc., New York...	1.31	1.31	1.36	1.76	
Skelp, grooved steel, P'gh	1.20	1.20	1.25	1.45	
Skelp, sheared steel, P'gh	1.25	1.25	1.35	1.50	
Steel hoops, Pittsburgh...	1.25	1.25	1.30	1.60	

	Sheets, Nails and Wire,	Cents.	Cents.	Cents.	Cents.
Per Lb. to Large Buyers:					
Sheets, black, No. 28, P'gh.	1.95	1.95	1.95	2.35	
Galv. sheets, No. 28, P'gh.	2.95	2.95	2.95	3.50	
Wire nails, Pittsburgh...	1.60	1.60	1.60	1.80	
Cut nails, Pittsburgh...	1.65	1.65	1.65	1.70	
Fence wire, base, P'gh...	1.40	1.40	1.40	1.60	
Barb wire, galv., P'gh...	2.00	2.00	2.00	2.20	

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Coke, Connellsville,

	Apr. 1.	Mar. 25.	Mar. 4.	Apr. 2,
Per Net Ton at Oven:	1914.	1914.	1914.	1913.
Furnace coke, prompt...	\$1.85	\$1.85	\$1.85	\$2.25
Furnace coke, future...	2.00	2.00	2.00	2.25
Foundry coke, prompt...	2.40	2.40	2.50	3.00
Foundry coke, future...	2.55	2.65	2.75	3.00

Metals.

Per lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lead copper, New York..	14.87 1/2	14.87 1/2	15.00	15.37 1/2
Electrolytic copper, N. Y.	14.87 1/2	14.50	14.37 1/2	15.12 1/2
Spelter, St. Louis.....	5.12 1/2	5.12 1/2	5.15	5.75
Spelter, New York.....	5.27 1/2	5.27 1/2	5.30	5.90
Lead, St. Louis.....	3.70	3.87 1/2	3.87 1/2	4.20
Lead, New York.....	3.80	4.00	4.00	4.35
Tin, New York.....	37.90	38.50	37.90	48.00
Antimony, Hallett's, N. Y.	6.75	6.75	7.00	8.50
Tin plate, 100-lb. box, P'gh.	\$3.30	\$3.30	\$3.30	\$3.60

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh, in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22 1/2c.; Kansas City, 42 1/2c.; Omaha, 42 1/2c.; St. Paul, 32c.; Denver, 84 1/2c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, 1/4 in. thick, 6 1/4 in. up to 100 in. wide, 1.15c. to 1.20c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers with extras:

Rectangular plates, tank steel or conforming to manufacturer's standard specifications for structural steel dated February 6, 1903, or equivalent, 1/4 in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered 1/4-in. plates. Plates over 72 in. wide must be ordered 1/4 in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gauges under 1/4 in. to and including 3-16 in....	10
Gauges under 3-16 in. to and including No. 8....	15
Gauges under No. 8 to and including No. 9....	25
Gauges under No. 9 to and including No. 10....	30
Gauges under No. 10 to and including No. 12....	40
Sketches (including straight taper plates) 3 ft. and over.....	10
Complete circles 3 ft. in diameter and over.....	20
Boiler and flange steel.....	10
"A. B. M. A." and ordinary firebox steel.....	20
Still bottom steel.....	30
Marine steel.....	40
Locomotive firebox steel.....	50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	10
Widths over 115 in. up to 120 in., inclusive.....	15
Widths over 120 in. up to 125 in., inclusive.....	25
Widths over 125 in. up to 130 in., inclusive.....	50
Widths over 130 in.....	1.00
Cutting to lengths, under 3 ft. to 2 ft. inclusive.....	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive.....	.50
Cutting to lengths, under 1 ft.....	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, 1/4 in. thick and over, and zees, 3 in. and over, 1.15c. to 1.20c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.....	.10
H-beams over 18 in.....	.10
Angles over 6 in. on one or both legs.....	.10
Angles, 3 in. on one or both legs, less than 1/4 in. thick, as per steel bar card, Sept. 1, 1909....	.70
Tees, structural sizes (except elevator, hand rail, car truck and conductor rail).....	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909.....	.20 to .80
Deck beams and bulb angles.....	.30
Hand rail tees.....	.75
Cutting to lengths, under 3 ft. to 2 ft. inclusive.....	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive.....	.50
Cutting to lengths, under 1 ft.....	1.55
No charge for cutting to lengths 3 ft. and over.	

Wire Products.—Fence wire, Nos. 0 to 9 per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, \$1.40; galvanized, \$1.80. Galvanized barb wire and fence staples to jobbers, \$2; painted, \$1.60. Wire nails to jobbers, \$1.60. Prices of the foregoing wire products to dealers in carload lots are 5c. higher. Woven wire fencing, 73 1/2 per cent. off list for carloads; 72 1/2 off for 1000-rod lots; 71 1/2 off for less than 1000-rod lots.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.									
Nos.	0 to 9	10	11	12 & 12 1/2	13	14	15	16	
Annealed	\$1.60	\$1.65	\$1.70	\$1.75	\$1.85	\$1.95	\$2.05	\$2.15	
Galvanized	2.05	2.05	2.10	2.15	2.25	2.35	2.75	2.85	

Wire Rods.—Bessemer, open-hearth and chain rods, \$26 to \$26.50.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe in effect from February 2, 1914, and iron pipe from June 2, 1913, all full weight:

Butt Weld				Iron.			
Inches.	Black.	Galv.		Inches.	Black.	Galv.	
1 1/2, 3/4 and 5/8	72 1/2	52	1 1/2 and 3/4	66	47		
1 1/2	76 1/2	66	3/8		65	46	
3/4 to 3	79 1/2	71	1 1/2		69	56	
			3/4 to 2 1/2		72	61	

Lap Weld				Reamed and Drifted			
Inches.	Black.	Galv.		Inches.	Black.	Galv.	
2	76 1/2	68	1 1/4		56	45	
2 1/2 to 6	78 1/2	70	1 1/2		67	56	
7 to 12	75 1/2	65	2		68	58	
13 to 15	52 1/2	..	2 1/2 to 4		70	61	
			4 1/2 to 6		70	61	
			7 to 12		68	55	

Butt Weld, extra strong, plain ends				Lap Weld, extra strong, plain ends			
Inches.	Black.	Galv.		Inches.	Black.	Galv.	
1 1/2, 3/4 and 5/8	67 1/2	57	3/8		63	52	
1 1/2	72 1/2	66	2		67	60	
3/4 to 1 1/2	76 1/2	70	3/4 to 1 1/2		71	62	
2 to 3	77 1/2	71	2 and 2 1/2		72	63	

Lap Weld, extra strong, plain ends				Butt Weld, double extra strong, plain ends			
Inches.	Black.	Galv.		Inches.	Black.	Galv.	
2	73 1/2	65	1 1/2		65	59	
2 1/2 to 4	75 1/2	67	2		66	58	
4 1/2 to 6	74 1/2	66	2 1/2 to 4		70	61	
7 to 8	67 1/2	57	4 1/2 to 6		69	60	
9 to 12	62 1/2	52	7 and 8		63	53	
			9 to 12		58	47	

To the large jobbing trade an additional 5 and 2 1/2 per cent. is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads, in effect from January 2, 1914, are as follows:

Lap Welded Steel		Standard Charcoal Iron	
Inches.	Black.	Inches.	Black.
1 1/2 and 2 in.	61	1 1/2 in.	45
2 1/2 in.	58	1 1/4 and 2 in.	49
2 1/2 and 2 1/2 in.	64	2 1/4 in.	45
3 and 3 1/4 in.	69	2 1/2 to 2 3/4 in.	54
3 1/2 and 4 1/2 in.	71	3 and 3 1/4 in.	57
5 and 6 in.	64	3 1/2 to 4 1/2 in.	60
7 to 13 in.	61	5 and 6 in.	49

Locomotive and steamship special charcoal grades bring higher prices.

2 1/2 in. and smaller, over 18 ft., 10 per cent. net extra.

2 1/2 in. and larger over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

Sheets.—Makers' prices for mill shipment on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets		Cents per lb.	
Nos. 3 to 8		1.40 to 1.45	
Nos. 9 to 10		1.45 to 1.50	
Nos. 11 and 12		1.50 to 1.60	
Nos. 13 and 14		1.55 to 1.65	
Nos. 15 and 16		1.65 to 1.70	

Box Annealed Sheets, Cold Rolled		Cents per lb.	
Nos. 10 and 11		1.60 to 1.65	
Nos. 12		1.60 to 1.65	
Nos. 13 and 14		1.65 to 1.70	
Nos. 15 and 16		1.70 to 1.75	
Nos. 17 to 21		1.75 to 1.80	
Nos. 22 and 24		1.80 to 1.85	
Nos. 25 and 26		1.85 to 1.90	
No. 27		1.90 to 1.95	
No. 28		1.95 to 2.00	
No. 29		2.00 to 2.05	
No. 30		2.10 to 2.15	

Galvanized Sheets of Black Sheet Gauge

	Cents per lb.
Nos. 10 and 11	1.95 to 2.00
No. 12	2.05 to 2.10
Nos. 13 and 14	2.05 to 2.10
Nos. 15 and 16	2.20 to 2.25
Nos. 17 to 21	2.35 to 2.40
Nos. 22 and 24	2.50 to 2.55
Nos. 25 and 26	2.65 to 2.70
No. 27	2.80 to 2.85
No. 28	2.95 to 3.00
No. 29	3.10 to 3.15
No. 30	3.25 to 3.30

Pittsburgh

PITTSBURGH, PA., April 1, 1914.

Conditions in the steel trade, as regards new demand, are probably as quiet as they were in November and December last, but specifications are coming in at a fairly active rate, being heavier on tin plate than on other products. In the last two days the feeling has been a little more cheerful, and a continuance of good weather will no doubt bring out a heavier volume of new business. Railroads are laying off every man that it is possible to do without, indicating that they are going to run close to shore in the near future in operating expenses and they will no doubt follow the same policy in making purchases. Specifications from heavy consumers of steel products, such as implement makers and automobile builders, are very unsatisfactory, being lighter at this time than for some years. Pig iron, steel, coke and scrap are very quiet, hardly enough new business coming out to establish prices.

Pig Iron.—The market is extremely quiet, there being practically no new inquiry. Prices on Bessemer, basic and foundry iron are fairly strong, and there does not seem to be any iron pressing the market to find sale. We quote: Bessemer, \$14; basic, \$13; No. 2 foundry, \$13.25 to \$13.50; gray forge, \$12.75 to \$13; malleable Bessemer, \$13.25 for delivery through first half of this year, all at Valley furnace, the freight rate to the Pittsburgh or Cleveland district being 90c. a ton.

Billets and Sheet Bars.—Little new inquiry is reported. As far as known, no sales of billets for second quarter have been made at \$22 or of sheet bars at \$23. Most consumers are covered for the next month or two, and are not yet considering new contracts for future delivery. We quote Bessemer and open-hearth billets at \$21 and Bessemer and open-hearth sheet bars at \$22, f.o.b. makers' mills, Pittsburgh or Youngstown, for April shipment. We quote forging billets at \$25 on desirable specifications, embracing only one size, and up to but not including 10 x 10 in., the regular extras being charged for larger sizes. On small orders forging billets are held at \$26. We quote axle billets at \$28 for desirable orders and \$24 for small orders.

Muck Bar.—No sales have come to light. We quote best grades of muck bar, made from all pig iron, at nominally \$27.50 to \$28 delivered to consumers' mills in the Pittsburgh district.

Steel Rails.—No important contracts for standard sections have been taken by rail interests in this vicinity the past week. New demand for light rails is fairly active, but prices are more or less irregular, partly due to the strong competition from mills that reroll light rails from standard sections. We quote splice bars at 1.50c. and standard section rails at 1.25c. Light rails, rolled from billets, are now quoted about as follows: 25, 30, 35, 40 and 45 lb. sections, 1.10c.; 16 and 20 lb., 1.15c.; 12 and 14 lb., 1.20c., and 8 and 10 lb., 1.25c., in carload lots, f.o.b. Pittsburgh. For large lots, these prices might be slightly shaded.

Plates.—The new demand for plates, which has been dull for some time, shows no betterment, but on the contrary seems to be getting lighter. The steel car shops are running short of work, and this week the McKees Rocks plant of the Pressed Steel Car Company is down in all departments except the passenger car shops, which are busy and have a good deal of work ahead. The other parts of the works will probably be idle for two or three weeks or longer. No important orders for cars were placed in the past week. The Pressed Steel Car Company has taken 35 passenger coaches and 3 combination

passenger and 2 baggage cars for the Southern Railway, in addition to 50 passenger cars taken recently for the Pittsburgh Railways Company, and has also taken 15 steel hopper cars for the Lackawanna & Wyoming Valley Railroad. The same company is now turning out an order for 60 ore cars for shipment to Chile to the Chile Exploration Company. The Atlantic Coast Line has placed 200 underframes with the Cambria Steel Company. The order of the Bessemer & Lake Erie for 2500 cars and that of the Duluth, Missabe & Northern for 1000 ore cars are expected to be placed shortly. The general demand for plates from the boiler shops is very quiet. Prices are weak. We quote $\frac{1}{4}$ -in. and heavier plates at 1.15c. to 1.20c., Pittsburgh, desirable orders readily being placed at the lower price.

Iron and Steel Bars.—In sympathy with other lines of finished products both iron and steel bars are quiet, and specifications against contracts are only fair. The implement trade is slow in specifying this year, and wagon makers are not ordering shipments heavily. Efforts to put the market on steel bars on the 1.25c. basis for second quarter were not successful, owing to the lack of new demand. Common iron bars are weaker. We quote steel bars at 1.15c. to 1.20c., and iron bars at 1.35c., f.o.b. makers' mills, Pittsburgh, but on desirable orders probably 1.30c. could be done. Extras for twisting reinforcing steel bars over the base price are as follows: $\frac{3}{4}$ in. and over, \$1; $\frac{1}{2}$ to 11-16 in., \$1.50; under $\frac{1}{2}$ in., \$2.50 per net ton. This is the schedule of extras in force by mills that roll steel bars from billets, but mills that roll bars from old rails sometimes omit them entirely.

Wire Rods.—Not much new demand is coming out as nearly all consumers are covered up to July. Mills report specifications as only fair. We quote Bessemer, open-hearth and chain rods at \$26 to \$26.50 f.o.b. Pittsburgh.

Skelp.—Mills that roll skelp have a fair amount of work ahead, but there is not much new demand. We quote grooved steel skelp, 1.20c. to 1.25c.; sheared steel skelp, 1.25c. to 1.30c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.65c. to 1.70c., delivered to consumers' mills in the Pittsburgh district.

Ferroalloys.—Ferromanganese is quiet, most consumers being covered for the remainder of this year. Importers are still quoting \$38, Baltimore, for 80 per cent. English ferromanganese, but local dealers say this price might be slightly shaded on a firm offer. The rate to Pittsburgh is \$2.16 per ton. We note sales of several carloads of 50 per cent. ferrosilicon at \$73 delivered to consumers' mills and prices are firm. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at \$73; over 100 tons to 600 tons, \$72; over 600 tons, \$71, delivered in the Pittsburgh district. We quote 10 per cent. ferrosilicon at \$20; 11 per cent., \$21, and 12 per cent., \$22, f.o.b. cars Jackson County, Ohio, or Ashland, Ky., furnaces. We quote 20 per cent. spiegeleisen at \$25 at furnace. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over, and 12 $\frac{1}{2}$ c. in less than 2000-lb. lots.

Structural Material.—Local fabricators report the new inquiry as very light. Only a few small jobs were placed in this district last week. The American Bridge Company has taken about 800 tons for an extension to the foundry of the Lorain Steel Company, Johnstown, Pa.; the Fort Pitt Bridge Works, 250 tons of bridge work for the Pennsylvania Railroad at Baltimore, and the John Eichleay, Jr., Company, about 250 tons for extensions to the Carnegie Library on the North Side in this city. Prices on plain material are weaker. We quote beams and channels up to 15-in. at 1.15c. on desirable orders and 1.20c. on small orders.

Sheets.—The new demand for black and galvanized sheets is fair. Business in roofing sheets is showing some betterment. It is understood that a rather large business in sheets for second-quarter delivery has been placed on the basis of about 1.95c. for No. 28 black and 2.95c. for No. 28 galvanized. In some cases, however, it is possible that these prices would be slightly shaded. Specifications are coming in at a good rate, and shipments by the mills are quite heavy. On an average, sheet mills are probably running at 65

to 75 per cent. of capacity. For April delivery we quote No. 28 Bessemer black sheets at 1.95c. to 2c.; No. 28 galvanized, 2.95c. to 3c.; Nos. 9 and 10 blue annealed sheets, 1.45c.; No. 28 tin mill black plate, H. R. and A., 1.90c. to 1.95c.; Nos. 29 and 30, 1.95c. to 2c. These prices are f.o.b. Pittsburgh, in carload and larger lots, jobbers charging the usual advances for small lots from store.

Tin Plate.—While the market is quiet as regards new demand, specifications on contracts are heavy. One leading maker states that its average specifications per day for March on both sheets and tin plate were the largest for any one month in its history. It is said that some of the tin-plate mills have already enough specifications on their books to take practically their entire output to October. New orders are only for small lots, and on these we quote 100 lb. cokes at \$3.30 to \$3.40 and 100 lb. ternes at \$3.20 to \$3.30 per base box, f.o.b. Pittsburgh.

Hoops and Bands.—Practically all consumers of both hoops and bands being covered up to July, the new demand is quiet, and only for small lots. Specifications against contracts are not rushing. We quote steel bands at 1.15c. to 1.20c., with extras as per the steel bar card, and steel hoops at 1.25c. to 1.30c., f.o.b. Pittsburgh.

Wire Products.—Makers expect an increase in specifications for wire and wire nails in April, as spring trade will likely open up now. In the last two or three weeks of March, specifications showed a material falling off. Shipments in February were heavy and stocks held by jobbers are quite large. The new demand from retailers for both wire and wire nails is only fair. The expected announcement of an advance in prices has not been made, and some in the trade believe that on account of the unsatisfactory conditions in general trade no advance will be made for the present. We quote: Wire nails, \$1.60; plain annealed wire, \$1.40; galvanized barb wire and fence staples, \$2; painted barb wire, \$1.60, all per 100 lb., f.o.b. Pittsburgh, with actual freight charge to point of delivery, terms being 30 days net less 2 per cent. off for cash in 10 days. We quote cut nails at \$1.65, f.o.b. Pittsburgh. Discounts on woven wire fencing are 73½ per cent. off in carload lots, 72½ per cent. off on 1000-rod lots and 71½ per cent. on less than 1000-rod lots, all f.o.b. Pittsburgh.

Shafting.—The new demand is quiet, and specifications from large consumers, such as the automobile and implement makers, are unsatisfactory. We quote cold-rolled shafting in carload and larger lots at 64 to 65 per cent. off, and in small lots from 61 to 63 per cent. off, delivered in base territory, depending on the order.

Spikes.—The inquiry of the Chesapeake & Ohio Railroad for 3000 kegs has not been placed. The new demand is quiet. On small spikes makers are pretty well filled for the next two or three months, and new demand is fairly active. We quote standard sizes of railroad spikes at \$1.45 to \$1.50 and small railroad and boat spikes at \$1.55 to \$1.60, per 100 lb., f.o.b. Pittsburgh.

Merchant Steel.—New buying is only in small lots to cover actual needs. Specifications against contracts have fallen off. Hardly enough new business is coming out to test prices, which are largely nominal. We quote: Iron finished tire, ½ x 1½ in. and larger, 1.35c., base; under ½ x 1½ in., 1.50c.; planished tire, 1.55c.; channel tire, ¾ to 7/8 and 1 in., 1.85c. to 1.95c.; 1½ in. and larger, 1.95c.; toe calk, 1.95c. to 2.05c., base; flat sleigh shoe, 1.70c.; concave and convex, 1.75c.; cutter shoe, tapered or bent, 2.25c. to 2.35c.; spring steel, 1.95c. to 2.05c.; machinery steel, smooth finish, 1.80c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and 1½ in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.25c.; soft, 3.50c.; coils, hard, 3.15c.; soft, 3.40c.; freight allowed. The usual differentials apply for lighter sizes.

Standard Pipe.—The report that the Hope Natural Gas Company, one of the Pew interests of this city, has placed a contract with the National Tube Company for 45 miles of 16-in. line pipe is untrue. This company has been figuring on the purchase of 30 to 35 miles but

the order has not yet been placed. There is a fair inquiry for line pipe from the gas and oil fields in Oklahoma, but only small quantities are being bought. The general demand for merchant pipe is quiet. The mills are operating to 75 per cent. of capacity or less. Discounts on iron and steel pipe are fairly well held.

Rivets, Nuts and Bolts.—Little new business in nuts and bolts is coming out as jobbers increased their stocks materially in February and early March, and these stocks have not moved out very freely. Specifications against contracts are not heavy, the trade taking in only such quantities as are needed for actual wants. The demand for rivets is quiet, as locomotive and boiler shops are running light, thus cutting down the consumption materially. Prices are only fairly strong. We quote button-head structural rivets at \$1.65 to \$1.70 and cone-head boiler rivets at \$1.75 to \$1.80, in carload lots, an advance of \$2 to \$3 a ton over these prices being charged for small lots, depending on the order. Terms are 30 days net, less 2 per cent. for cash in 10 days. Discounts on nuts and bolts are as follows in lots of 300 lb. or over, delivered within a 20c. freight radius of makers' works:

Coach and lag screws.....	80 and 5% off
Small carriage bolts, cut threads.....	80 and 5% off
Large carriage bolts.....	75 and 5% off
Small machine bolts, cut threads.....	80 and 5% off
Small machine bolts, rolled threads.....	80 and 10% off
Large machine bolts.....	75 and 10% off
Machine bolts, c.p.c. & t nuts, small.....	80 and 5% off
Machine bolts, c.p.c. & t nuts, large.....	75 and 5% off
Square h.p. nuts, blanked and tapped.....	\$6.30 off list
Hexagon nuts.....	\$7.20 off list
C.p.c. and r sq. nuts, blanked and tapped.....	\$6.00 off list
Hexagon nuts, ¾ and larger.....	\$7.20 off list
Hexagon nuts, smaller than 9/16.....	\$7.20 off list
C.P. plain square nuts.....	\$7.80 off list
C.P. plain hexagon nuts.....	\$5.50 off list
Semi-fin. hex. nuts, ¾ and larger.....	85 and 5% off
Semi-fin. hex. nuts, smaller than 9/16. 85, 10 & 10% off	85, 10 & 10% off
Rivets, 7/16 x 6½, smaller & shorter.....	80, 10 & 5% off
Rivets, metallic tinned, bulk.....	80, 10 and 5% off
Rivets, tin plated, bulk.....	80, 10 and 5% off
Rivets, metallic tinned, packages.....	80, 10 and 5% off
Standard cap screws.....	70, 10 and 10% off
Standard set screws.....	75, 10 and 10% off

Boiler Tubes.—The new demand for locomotive and merchant tubes is quiet, and prices are more or less irregular. The condition of the boiler-tube business has been unsatisfactory for some time.

Old Material.—The only scrap moving from dealers to consumers is on contracts placed some time ago, as there has been no new buying for the past three or four weeks. Prices on selected heavy steel scrap have settled down to about \$12, and the only business going is between dealers, some of whom are covering short sales. A good deal of compressed side and end sheet scrap is being offered, and prices are lower. We note sales of 300 tons of low phosphorus melting stock at \$15, delivered; about 1600 tons of heavy steel scrap at \$12 to \$12.25, delivered; 400 tons of turnings at about \$7.75, delivered, and 250 tons of borings at about \$8, delivered. Dealers quote as follows, per gross ton, for delivery to consumers' mills in the Pittsburgh and nearby districts:

Selected heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery	\$12.00
Compressed side and end sheet scrap	\$11.00 to 11.25
No. 1 foundry cast	11.50 to 11.75
No. 2 foundry cast	10.25 to 10.50
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	8.50 to 8.75
Reroiling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	13.00 to 13.25
No. 1 railroad malleable stock	11.00 to 11.25
Railroad grate bars	10.25 to 10.50
Low phosphorus melting stock	14.75 to 15.00
Iron car axles	22.50 to 23.00
Steel car axles	15.50 to 16.00
Locomotive axles, steel	20.00 to 20.50
No. 1 busheling scrap	10.25 to 10.50
No. 2 busheling scrap	7.25 to 7.50
Machine shop turnings	7.75 to 8.00
Old carwheels	11.25 to 11.50
Cast-iron borings	8.00 to 8.25
Sheet bar crop ends	12.00 to 12.25
Old iron rails	13.75 to 14.00
No. 1 railroad wrought scrap	11.50 to 11.75
Heavy steel axle turnings	8.50 to 8.75
Heavy breakable cast scrap	12.00 to 12.25

†Shipping point.

Coke.—The depression existing in the general steel trade and the low prices ruling for pig iron are being

reflected in the coke market, which is not firm. Standard grades of blast-furnace coke have been offered recently at \$1.90 and probably \$1.85 could be done on a firm offer. A sale is reported of 6000 tons per month of standard furnace coke for April, May and June delivery at \$2 per net ton at oven. Several of the leading makers of standard Connellsville furnace coke say they are holding firm at \$2 for second quarter, but admit they are selling very little. The new demand for foundry coke is only fair, and prices are not strong. We quote standard makes of blast-furnace coke for spot shipment at \$1.85 to \$1.90 and for second quarter \$2 per net ton at oven. Standard 72-hr. foundry coke is about \$2.50 per net ton at oven to consumers, but some makers are selling as low as \$2.35. The output of coke in the Upper and Lower Connellsville regions for the week ended March 21 was 364,080 tons, an increase over the previous week of nearly 12,000 tons, according to figures given in the Connellsville Courier.

Chicago

CHICAGO, ILL., March 31, 1914.

Despite the heroic effort made in January and February, business finds itself forced back into a position quite as unfavorable as that occupied in the last quarter of 1913. Disappointment is written large over the review of the past month. Industry, seemingly, has found the path of progress blocked by stubborn forces, apparently friendly yet immovable—a barrier insensible to pleading, logic or derision; a court martial in whose proceedings the cause of the just waits tediously upon the trial of the unjust and without redress. Retrenchment by the railroads is more emphatic. Spring building activity lends some comfort to the anxious waiting, but gradually weakening prices mark the strain that is proving greater than endurance. For structural shapes 1.20c., Pittsburgh, is still being asked, but ordinary buyers expect to do at least \$1 a ton better. The same is true of bars and plates in larger measure. Quotations on sheets have so generally declined from the basis of 2c. and 3c., Pittsburgh, for No. 28 black and galvanized that these prices are only obtainable as indicating a marked preference. Apathy was never more pronounced among the melters of pig iron. Foundries are finding the shipment schedules for which they arranged earlier in the year much too heavy for their needs. In the North prices are stationary, but Southern quotations show signs of weakness. In the scrap market trading is reduced to a minimum.

Pig Iron.—Some of the Lake furnaces still have as a source of satisfaction the fact that they are shipping more iron than they are making. It is well that in at least one particular the balance is on the right side of the ledger for certainly there is a plethora of unsatisfactory conditions. Sales are practically at a standstill. For Northern iron there seems to be no question about prices, but Southern iron is again selling at \$10.50, Birmingham. This is a recession of at least 25c. a ton and suggests that even greater weakness might be disclosed were attractive tonnage to be offered. No improvement is to be noted in the prevalence of deferred shipments. Noncompetitive sales of charcoal iron are reported at prices based on a minimum of \$14 at the furnace, but evidence is not lacking that other interests are making quotations 50c. a ton lower to secure business. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal	\$15.25 to \$16.25
Northern coke foundry, No. 1	14.75 to 15.00
Northern coke foundry, No. 2	14.25 to 14.75
Northern coke foundry, No. 3	14.00 to 14.25
Southern coke, No. 1 f'dry and 1 soft	15.35 to 15.85
Southern coke, No. 2 f'dry and 2 soft	14.85 to 15.35
Southern coke, No. 3	14.35 to 14.85
Southern coke, No. 4	13.85 to 14.35
Southern gray forge	13.35 to 13.85
Southern mottled	13.10 to 13.35
Malleable Bessemer	14.25 to 14.50
Standard Bessemer	17.00
Basic	13.75 to 14.25
Jackson Co. and Ky. sil'vy, 6 per cent.	16.90 to 17.40
Jackson Co. and Ky. sil'vy, 8 per cent.	17.90 to 18.40
Jackson Co. and Ky. sil'vy, 10 per cent.	18.90 to 19.40

Rails and Track Supplies.—The Chicago, Milwaukee & St. Paul has ordered the tie plates for which it recently inquired from a Chicago mill. Other railroad purchases are negligible. We quote standard railroad spikes at 1.50c. to 1.55c., base; track bolts with square nuts, 2c. to 2.10c., base, all in carload lots, Chicago; tie plates, \$26 to \$28 net ton; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—A total of 11 contracts for buildings and bridges covering an aggregate of 3233 tons, of which the largest single item is 780 tons, is reported as closed during the week. The Northern Pacific is taking 780 tons for the Lewis River bridge and the Ladish-Scoppenbach Company 190 tons for a malt house at Milwaukee. The American Bridge Company will furnish 103 tons for reinforcing the Twentieth avenue bridge at Minneapolis; 225 tons for a power house for the Inspiration Consolidated Copper Company, Miami, Ariz., and 420 tons for the Mammoth Copper Company, Kennett, Cal. The Missouri Bridge & Iron Company will fabricate 145 tons for the United Railways Company, St. Louis; 121 tons for the Terminal Railway Association, also at St. Louis. The Minneapolis Steel & Machinery Company took 127 tons for the Casparis Stone Company, Dresser Junction, Wis. The Northwest Steel Company took 622 tons for a dock at Portland, Ore. The Blaw Collapsible Steel Centering Company was awarded 150 tons for the Southern California Edison Company tower extensions and the Llewellyn Iron Works will supply the 350 tons of steel for the new plant of the Griffin Wheel Company at Los Angeles. New structural projects at Chicago, for which figures are being taken, include the Heyworth building and another unit of the Crane Company plant, the latter requiring about 2400 tons. Arrangements have been completed for building an addition to the Borland building which will take between 3000 and 4000 tons. Inquiries for cars in this market cover a total of 7000, for which about 50,000 tons of steel will be needed. This list includes, in addition to cars previously mentioned, 2000 for the Chicago & Northwestern and 1000 for the Great Northern. Structural specifications are fair and the mills are trying to get 1.38c., Chicago, on new business. It is needless to say that if 1.20c., Pittsburgh, is the top of the market, favored customers are able to do better than that. We quote for Chicago delivery, shipment from mill, 1.33c. to 1.38c.

For Chicago delivery, from store, we continue to quote 1.75c.

Plates.—Bookings of plates are no better as to tonnage and in the range of going prices the lower quotations predominate. We quote, for shipment from mill, Chicago delivery, 1.33c. to 1.38c.

For Chicago delivery from store we quote 1.75c.

Sheets.—The tonnage of sheets being offered as specifications and orders is declining. The leading interests in this market continue to adhere to a price basis \$1 a ton above the market and are taking little or no business, but this status cannot long continue. We quote for Chicago delivery from mill: No. 10 blue annealed, 1.58c.; No. 28 black, 2.13c. to 2.18c.; No. 28 galvanized, 3.13c. to 3.18c.

For sheets out of store we quote for Chicago delivery as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 1.95c.; No. 28 black, 2.45c. to 2.55c.; No. 28 galvanized, 3.50c. to 3.60c.

Bars.—Steel bar specifications are generally good, being better, unquestionably, than specifications in any other of the heavy lines. This is more especially true of reinforcing bars. Tonnage in bar iron is lighter, if anything, and mill operations are eased up slightly as compared with February, but prices are better. Makers appear to be recognizing the futility of low prices, both from the standpoint of producing business and of costs, and are declining business, except at prices that represent a better basis. We quote for mill shipments as follows: Bar iron, 1.17½c. to 1.20c.; soft steel bars, 1.38c.; hard steel bars, 1.30c.; shafting in carloads, 65 per cent. off; less than carloads, 60 per cent. off.

We quote store prices for Chicago delivery: Soft steel bars, 1.65c.; bar iron, 1.65c.; reinforcing bars, 1.65c. base, with 10c. extra for twisting in sizes $\frac{1}{2}$ in. and over and usual extra for smaller sizes; shafting 60 per cent. off.

Hoops and Bands.—Although the mill at Alton is operating at a nearer approach to full capacity than it has up to this time, the period of the year in which buying is normally heaviest finds the tonnage offered noticeably below par. None of the buyers whose requirements run into large tonnage is in the market for anything but emergency requirements. Concessions in price are general and the more desirable business in hoops is being placed on a basis equivalent to 1.25c., Pittsburgh. We quote for bands, 1.38c., Chicago, and for hoops, 1.43c. to 1.48c.

Rivets and Bolts.—An increase in the number and size of orders for rivets is reported. But while the volume of business is moderately satisfactory for the first time in many months, prices evidence no improvement whatever. Bolt business offers nothing new. We quote from mill as follows: Carriage bolts up to $\frac{3}{4}$ x 6 in., rolled thread, 80-5; cut thread, 80; larger sizes, 75-5; machine bolts up to $\frac{3}{8}$ x 4 in., rolled thread, 80-10; cut thread, 80-5; larger sizes, 75-10; coach screws, 80-15; hot pressed nuts, square head, \$6.20 off per cwt.; hexagon, \$7 off per cwt. Structural rivets, $\frac{1}{2}$ to $1\frac{1}{4}$ in., 1.73c. to 1.78c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

We quote out of store: Structural rivets, 2.35c.; boiler rivets, 2.50c.; machine bolts up to $\frac{3}{8}$ x 4 in., 75-10; larger sizes, 70-10-5; carriage bolts up to $\frac{3}{8}$ x 6 in., 75-5; larger sizes, 70-10 off; hot pressed nuts, square head, \$6.00, and hexagon, \$6.70 off per cwt.

Wire Products.—The wire trade is establishing no new precedents, but under the impetus of spring buying is showing the usual upward tendency in volume which March and April bring. We quote to jobbers as follows: Plain wire No. 9 and coarser, base, \$1.58; wire nails, \$1.78; painted barb wire, \$1.78; galvanized, \$2.18; polished staples, \$1.78; galvanized, \$2.13, all Chicago.

Cast-Iron Pipe.—The leading interest has been awarded the contract for 1600 tons of pipe at Cincinnati, Ohio, and the Detroit shop will make the 10,000 tons of pipe for that city. The week was a quiet period for new business. We quote as follows, per net ton, Chicago: Water pipe, 4 in., \$26; 6 to 12 in., \$24; 16 in. and up, \$23.50, with \$1 extra for gas pipe.

Old Material.—There have been few periods when interest in the scrap market has been reduced to as low an ebb. Consumers have no inclination to buy, with shrinking orders for new material, and sellers have no inclination to sell at the prices obtainable. The Chicago & Northwestern is offering 2700 tons on a scrap list and the Santa Fé about 5000 tons. We quote, for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Old iron rails	\$12.75 to \$13.25
Old steel rails, rerolling	11.50 to 12.00
Old steel rails, less than 3 ft.	10.50 to 11.00
Relaying rails, standard section, subject to inspection	24.00
Old carwheels	11.75 to 12.25
Heavy melting steel scrap	9.75 to 10.00
Frogs, switches and guards, cut apart	9.75 to 10.00
Shoveling steel	9.00 to 9.25
Steel axle turnings	6.75 to 7.25

Per Net Ton

Iron angles and splice bars	\$12.25 to \$12.75
Iron arch bars and transoms	12.25 to 12.75
Steel angle bars	8.75 to 9.25
Iron car axles	17.50 to 18.00
Steel car axles	12.50 to 13.00
No. 1 railroad wrought	9.00 to 9.25
No. 2 railroad wrought	8.00 to 8.50
Cut forge	8.00 to 8.50
Steel knuckles and couplers	9.00 to 9.50
Steel springs	9.75 to 10.25
Locomotive tires, smooth	10.00 to 10.50
Machine shop turnings	4.75 to 5.25
Cast borings	4.50 to 5.00
No. 1 busheling	7.50 to 8.00
No. 2 busheling	6.00 to 6.50
No. 1 boilers, cut to sheets and rings	6.50 to 7.00
Boiler punchings	9.25 to 9.75
No. 1 cast scrap	10.25 to 10.75
Stove plate and light cast scrap	9.25 to 9.75
Grate bars	9.00 to 9.50
Railroad malleable	9.00 to 9.50
Agricultural malleable	8.25 to 8.75
Pipes and flues	6.75 to 7.25

In April the following will move their Chicago offices from the old Continental & Commercial National

Bank Building at 72 West Adams street to the new building of the same name, one block west, at Adams and LaSalle streets: Calumet Steel Company, Russell, Burdsall & Ward Bolt & Nut Company, Morden Frog & Crossing Company, Chicago Retort & Fire Brick Company, Gary Screw & Bolt Company, Pittsburgh Screw & Bolt Company, Lackawanna Steel Company, American Bridge Company, American Sheet & Tin Plate Company, Universal Portland Cement Company, Pittsburgh Steamship Company, National Council for Industrial Safety, Worden-Allen Company, Lackawanna Bridge Company, M. H. Treadwell Company, American Wire Fabrics Company, Harbison-Walker Refractories Company, Carpenter Steel Company, Illinois Steel Company, American Steel & Wire Company, National Tube Company, Carnegie Steel Company, Taylor-Wharton Iron & Steel Company.

Philadelphia

PHILADELPHIA, March 31, 1914.

The statements relating to trains discontinued and trainmen laid off, which have been issued by Eastern railroads, appear to have crystallized the sentiment inspired by unsatisfactory conditions in the iron and steel trades, and references to the lessened number of orders from this source are even more common and specific than they have been. Not all of the sympathy with the roads is unalloyed, as some interested observers point out that much business has been irretrievably lost. The dullness in pig iron is unabated, but prices are well held. In bars, plates and shapes there is more general agreement as to a lower base for desirable business. Sheets, both as to specifications and price, are holding up best. Scrap material is dull and in several instances prices are substantially lower.

Iron Ore.—Importations in the week ended March 28 were 6015 tons from Spain and 4700 tons from Cuba. The market is inactive.

Pig Iron.—The market continues extremely dull, some sellers declaring that the current period is the dullest of recent years. Of course, there have been some transactions in the last week, but the bulk of them were small. The Delaware River pipe makers show the most interest, inasmuch as the active season for their product is approaching and some of them are looking 'round for cheap iron, but they are alive to the situation and are disposed to make their own price. Some offers made for "off" iron, which is acceptable for pipe making when mixed with better grades, have been refused. There were a few sales of eastern Pennsylvania No. 2 X and No. 2 plain in quantities ranging from 1500 tons of No. 2 plain downward, the bulk of the No. 2 X going at \$15.25 per ton and the No. 2 plain at 25c. less. One office sold 2300 tons of No. 4 outside of its district on account of a branch office in another territory. Among other sales reported was 1000 tons of gray forge for prompt delivery at \$13.65 at furnace. A few small lots of standard low phosphorus have been sold at \$21, delivered. Basic has been more quiet than foundry grades, although an Eastern consumer is understood to have bought 2000 or 3000 tons, supplementary to other quantities recently taken, probably 5000 to 6000 tons in all. The comparative inactivity of steel casting foundries who get much of their business from railroads is exemplified by the fact that they show little or no interest in offerings of billet croppings made to them by Eastern steel mills. Virginia irons are generally unchanged, the deliveries keeping up fairly well, but no disposition being shown to buy far ahead. An inquiry is out for 500 tons of malleable iron and another for 1000 tons of cylinder iron, the latter of special analysis, running 1.15 to 1.50 per cent. silicon. The Norfolk & Western Railway has yet to purchase for its needs. Prices of standard foundry grades have varied little, if at all, most of the makers declaring that they have their backs against the wall. An offer of \$15.10 for a standard brand of No. 2 X was refused early this week. Gray forge and basic can be more easily obtained at or near the minimum than was the case a

week ago. The following range of prices about represents the market for near future delivery in buyers' yards in this district:

Eastern Penna. No. 2 X foundry	\$15.00 to \$15.25
Eastern Penna. No. 2 plain	14.75 to 15.00
Virginia No. 2 X foundry	15.55 to 15.75
Virginia No. 2 plain	15.55 to 15.75
Gray forge	14.00
Basic	14.25
Standard low phosphorus	21.00

Ferroalloys.—The demand is no stronger, with quotations at \$39, Baltimore, for English 80 per cent. ferromanganese and \$38, Baltimore, for German. The foreign 50 per cent. ferrosilicon recently offered is of Swedish manufacture. Despite the understanding that some concessions go with the offers, not much has been done to date. In the week there arrived at this port 197 tons of ferrosilicon from Sweden. Sellers of domestic 50 per cent. ferrosilicon quote \$71 to \$73, Pittsburgh, according to quantity, and a sale of a carload is reported at the latter price. For 11 per cent. the quotation is \$24.30, delivered.

Cast-Iron Pipe.—The quotation for 6-in. pipe at the Delaware River foundries remains at \$21.50 per net ton, standard weight, in carload lots, with 4-in. pipe \$2 higher and larger sizes 50c. less. As was stated last week, the outlook is good.

Billets.—While eastern Pennsylvania makers would like to be busier than the 60 per cent. of capacity at which they are operating, they report no cancellations and a fair maintenance of specifications against contracts, and \$23.40 to \$24.40 is the unchanged quotation for open-hearth rolling billets, with forging steel \$4 to \$5 per ton higher than rolling.

Plates.—On large and desirable orders, 1.15c. Pittsburgh, or 1.30c., Philadelphia, can be obtained without difficulty, but the miscellaneous moderate-sized and small orders which make up the bulk of business still command 1.20c., Pittsburgh, or 1.35c., Philadelphia, for carloads and 1.38c. for part carloads. Makers are regarding with close interest the placing of the big steel contracts for the third tracking of the New York elevated railroad in view of the large percentage of steel plates which will be used in the fabricating. Demand from boat builders is wanting.

Structural Material.—While the general quotation is 1.20c., Pittsburgh, or 1.35c., Philadelphia, desirable business would be taken on a basis of 1.15c., Pittsburgh, or 1.30c., delivered here. The new building of the Board of Home Missions of the Methodist Episcopal Church will require more material than the 200 to 300 tons mentioned last week. At least 500 tons, and perhaps more, will be needed. The Southern Railway is expected to purchase 3800 tons of plain shapes to be used in the building of cars, to be followed by other purchases bringing the total up to about 9000 tons. It is pointed out that to some extent the poor buying by the railroads has been compensated for by the better activity in other directions. Eastern Pennsylvania mills have not contracted for the second quarter where it could be avoided, preferring to take specifications irrespective of contracts at 1.20c., Pittsburgh, or 1.35c., delivered here.

Bars.—Iron bars are not strong at 1.22½c., delivered here, and the market is quiet. Steel bars, which are quiet also, are generally quoted at 1.35c., Philadelphia, but 1.30c. can be found without much looking where a desirable order is in prospect.

Sheets.—For No. 10 blue annealed sheets the quotation is 1.55c., delivered, and eastern Pennsylvania makers continue to run fairly close to capacity.

Old Material.—Heavy melting steel has sold in good quantities at \$11. In the last two weeks an Eastern plate maker has taken probably 25,000 tons at prices ranging from \$11 to \$11.50 and is now practically out of the market. Stove plate sold early last week at \$10 and later there were sales at \$9.50. On the whole the market is dull. The following quotations about represent the market for deliveries in buyers' yards in this district, covering eastern Pennsylvania and taking freight rates varying from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel	\$11.00 to \$11.25
Old steel rails, rerolling	13.00 to 15.00
Low phosphorus heavy melting steel scrap (nominal)	14.50 to 15.00
Old steel axles (nominal)	15.25 to 15.75
Old iron axles	21.00 to 22.00
Old iron rails (nominal)	16.50 to 17.00
Old carwheels	12.00 to 12.50
No. 1 railroad wrought	13.50 to 14.00
Wrought-iron pipe	10.50 to 11.00
No. 1 forge fire	8.50 to 9.00
Bundled sheets	8.50 to 9.00
No. 2 light iron (nominal)	5.00
No. 2 busheling (nominal)	8.00 to 8.50
Wrought turnings	8.00 to 8.75
Cast borings	8.50 to 8.75
Machinery cast	13.00 to 13.50
Grate bars, railroad	9.00 to 9.50
Stove plate	9.00 to 9.50
Railroad malleable	9.00 to 9.50

Coke.—The market shares the dullness prevailing in pig iron, with quotations unchanged at \$1.90 per net ton at oven for prompt shipment Connellsville furnace coke, and contract coke at \$2. For Connellsville foundry coke, \$2.50 to \$2.75 per net ton at oven is quoted. Freight rates from the producing districts are as follows: Connellsville, \$2.05; Mountain, \$1.65, and Latrobe, \$1.85.

Cleveland

CLEVELAND, OHIO, March 31, 1914.

Iron Ore.—No sales are as yet being made. Ore firms have about given up hope of improved conditions before the buying movement that would enable them to attempt to hold to last season's prices, but until the market is established by actual sales, any forecast as to prices is merely guess work. The opening of the Lake shipping season will be very late. Few bulk steamers will be in commission before May 1. The closing down of the Ohio coal mines April 1 until the miners and operators effect a wage agreement and the constitutionality of the mine-run basis payment law is tested in the courts will help delay the opening of the lake shipping season. We quote 1913 prices as follows: Old range Bessemer, \$4.40; Mesaba Bessemer, \$4.15; old range non-Bessemer, \$3.50; Mesaba non-Bessemer, \$3.40.

Pig Iron.—The extreme dullness continues, practically no sales being reported even in small lots and no inquiries are pending. While there is no business to test prices sellers are firmly adhering to recent quotations which will probably remain unchanged until a buying movement is started for the last half. This is not expected for several weeks. Foundries making automobile castings are now quite busy, but conditions in other foundries show no improvement. Southern iron is freely offered at \$10.75 Birmingham for No. 2. One seller has opened its books for the third quarter at \$11, but has made no sales. We note the sale of 200 tons of No. 1 Southern to a Cleveland consumer at \$11 for the second quarter. We quote delivered Cleveland as follows:

Bessemer	\$14.90
Basic	13.90 to 14.00
Northern No. 2 foundry	14.25
Southern No. 2 foundry	15.10 to 15.35
Gray forge	13.50
Jackson Co. silvery, 8 per cent. silicon	17.55

Coke.—The market is very dull. Standard 72-hr. foundry coke is held at \$2.50 to \$2.75 per net ton, but some makes can be had at \$2.35 to \$2.40. We quote furnace coke at \$1.85 to \$2 for prompt shipment.

Finished Iron and Steel.—Demand in finished lines continues dull and prices are not being maintained. For some time during the slump following the January buying movement mills attempted to hold up prices, but now sellers are disposed to fight for all the business that is going and to meet low quotations made by competitors. While the regular asking price for steel bars remains at 1.20c. some sales are being made at 1.15c. and it is probable that any one having a desirable order to place will have no difficulty in getting that price. Some mills are now looking for second quarter bar contracts at 1.25c., agreeing to take April specifications at 1.20c., but it is probable that very little business will be placed on this basis. There is a fair volume of inquiry for bars for re-inforcing purposes. An inquiry for 400 tons for a Ford Motor car service station in Toronto, Ont., is being figured on. Plates have eased off to 1.15c. for

good lots. Considerable inquiry is coming from tank and boiler makers. Structural material seems to be well maintained at 1.20c., but the new demand is light and the market has not been tested on a round lot inquiry. Spring is bringing out a fair volume of municipal and county bridge work and Ohio fabricators are figuring on bridges aggregating about 5000 tons. Sheets are quiet with prices unchanged. There is little demand for bar iron and local rolling mills are practically shut down. We quote bar iron at 1.20c. to 1.25c. Cleveland. The Lackawanna Steel Company has taken 1000 tons of standard rails, 500 tons for the Cleveland Railway Company and 500 tons for the Buffalo & Lake Erie Traction Company in Erie, Pa. The Cleveland Water Works Department will receive bids April 2 for 8500 tons of cast iron pipe and 730 tons of castings. We quote stock prices at 1.80c. for steel bars, 1.75c. for iron bars and 1.90c. for plates and structural material.

Bolts and Rivets.—Some bolt and nut makers report a better volume of business in February than in March. Consumers are buying mostly in small lots from jobbers at prices lower than present quotations and jobbers are specifying quite freely. Rivets are quiet and not firm at \$1.65 for structural and \$1.75 for boiler. We quote discounts as follows: Common carriage bolts, $\frac{1}{8}$ x 6 in. smaller or shorter, rolled thread, 80 and 5 per cent.; cut thread, 80 per cent.; larger or longer, 75 and 5 per cent.; machine bolts with h.p. nuts, $\frac{1}{8}$ x 4 in., smaller or shorter, rolled thread, 80 and 10 per cent.; cut thread, 80 and 5 per cent.; larger or longer, 75 and 10 per cent.; coach and lag screws, 80 and 15 per cent.; square h.p. nuts, blank or tapped, \$6.30 off; hexagon h.p. nuts, blank or tapped, \$7.20 off; c. p. c. and t. square nuts, blank or tapped, \$6 off; hexagon, $\frac{1}{8}$ in. and larger, \$7.20 off; 9-16 in. and smaller, \$7.80 off; semi-finished hexagon nuts, $\frac{1}{8}$ in. and larger, 85, 10 and 5 per cent.; 9-16 in. and smaller, 85, 10, 10 and 5 per cent.

Old Material.—Trading between dealers has fallen off as they are rapidly getting their orders filled. Mills are holding back on shipments and the embargo at the plant of the Upson Nut Company continues. Turnings have declined 25c. a ton and agricultural malleable and iron axles are lower. Other quotations are unchanged although the market is weak and the outlook far from promising. We quote f.o.b. Cleveland as follows:

Per Gross Ton

Old steel rails, rerolling	\$11.50 to \$12.00
Old iron rails	13.50 to 14.00
Steel car axles	15.00 to 15.25
Heavy melting steel	10.50 to 11.00
Old carwheels	11.50 to 12.00
Relaying rails, 50 lb. and over	23.00 to 25.00
Agricultural malleable	8.50 to 9.00
Railroad malleable	10.75 to 11.00
Light bundled sheet scrap	7.50 to 8.00

Per Net Ton

Iron car axles	\$18.00 to \$19.00
Cast borings	5.75 to 6.00
Iron and steel turnings and drillings	5.25 to 5.50
Steel axle turnings	6.75 to 7.25
No. 1 busheling, new	8.75 to 9.00
No. 1 busheling, old	8.00 to 8.25
No. 1 railroad wrought	10.00 to 10.50
No. 1 cast	10.75 to 11.00
Stove plate	8.75 to 9.00

Birmingham

BIRMINGHAM, ALA., March 30, 1914.

Pig Iron.—The situation here is about as stated by J. C. Maben, president Sloss-Sheffield Steel & Iron Company, who said a few days ago: "It is the quietest pig-iron market in the history of our company, with no prospect of an early change for the better." So thoroughly impressed are the Alabama iron makers with the unsatisfactory outlook that the already comparatively light production is to be still further curtailed. The Woodward Iron Company, which is credited with the largest amount of forward delivery orders of any concern in the district, has blown out a furnace for relining. The Gulf States Steel Corporation has also blown out its stack at Gadsden. Production will be considerably decreased this month. One of the companies with a large stock of iron on hand, thus creating every inducement to sell, reports disposing of less than the month's make in March. Several makers say recent sales have been purely for spot. When in small lots such sales were at \$11. Furnace interests continue

to quote \$11.25 for third quarter, but, as no business worth mentioning has been done, the quoted price is merely on paper. The present basis is admittedly from \$10.75 to \$11, the lower price being the quotation for competitive territory. There is no real inquiry. What the market will be if a buying movement sets in is problematical. It is understood that business has been solicited in the East without avail in the past 10 days. No improvement is seen in the foundry demand. We quote, per gross ton, f.o.b. furnaces, as follows:

No. 1 foundry and soft	\$11.25 to \$11.50
No. 2 foundry and soft	10.75 to 11.00
No. 3 foundry	10.25 to 10.50
No. 4 foundry	10.00 to 10.25
Gray forge	9.75 to 10.00
Basic	10.50 to 11.00
Charcoal	23.50 to 24.00

Cast-Iron Pipe.—A large order for water pipe was received the past week, and scattering lots made a fair showing. The soil-pipe plants continue to operate to capacity, owing to the regular spring demand, with prices satisfactory. The Central Foundry Company, Bessemer, maker of the Universal joint pipe, has resumed operations since shipping a large accumulation. We quote, per net ton, f.o.b. plants, as follows: 4-in., \$21; 6-in. and upward, \$19, with \$1 added for gas pipe.

Coal and Coke.—No additional coal mines have closed down, but the trade is still dull. The prospect is slightly better, owing to the beginning of the summer demand for stocking yards. The cold weather in March helped the domestic yards to get rid of the stocks carried over from the warm early winter. Coke is in better demand, owing possibly to the smaller output. The Gulf States Steel Corporation has shut down a part of its plant at Virginia Mines. We quote, per net ton, f.o.b. ovens, as follows: Furnace coke, \$2.50 to \$2.85; foundry, \$3.25 to \$3.70.

Old Material.—The market reflects the general dullness, except in stove plate and other light grades, for which the demand has been satisfactory. We quote, per gross ton, f.o.b. dealers' yards, as follows:

Old iron axles	\$14.50 to \$15.00
Old steel axles	14.50 to 15.00
Old iron rails	13.00 to 13.50
No. 1 railroad wrought	10.00 to 11.00
No. 2 railroad wrought	8.50 to 9.00
No. 1 country wrought	9.00 to 10.00
No. 2 country wrought	8.00 to 9.00
No. 1 machinery cast	9.50 to 10.00
No. 1 steel scrap	8.00 to 8.50
Tram carwheels	9.50 to 10.00
Standard carwheels	10.50 to 11.00
Stove plate	8.00 to 8.50

Boston

BOSTON, MASS., March 31, 1914.

Old Material.—Steel scrap has dropped 50c., the few sales that have been made being at the reduced price. Other prices are wholly nominal, hardly any transactions being reported. The mills are buying in an exceedingly meager way, but little material is coming out except in some cases where it has been held back too long in the expectation of a rapidly advancing market. Every one seems to be marking time. It is an interesting fact that the shipments by dealers in March were well in excess of those for February, but this was to a large extent because of contracts placed earlier in the year. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of \$2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel	\$8.25 to \$8.50
Low phosphorus steel	13.75 to 14.75
Old steel axles	13.25 to 13.75
Old iron axles	21.25 to 21.75
Mixed shafting	12.75 to 13.00
No. 1 wrought and soft steel	9.00 to 9.25
Skeleton (bundled)	6.00 to 6.50
Wrought-iron pipe	8.25 to 8.50
Cotton ties (bundled)	7.25 to 7.75
No. 2 light	3.75 to 4.25
Wrought turnings	5.50 to 6.00
Cast borings	5.75 to 6.25
Machinery, cast	11.25 to 11.50
Malleable	8.00 to 8.25
Stove plate	7.75 to 8.00
Grate bars	6.25 to 6.50
Cast-iron carwheels	11.00 to 11.25

Cincinnati

CINCINNATI, OHIO, April 1, 1914.—(By Wire.)

Pig Iron.—The market is passing through an almost unprecedented dull period. Very little business is being transacted in this territory, although a few sales of Southern iron are reported from the St. Louis district. Prices on Southern iron are weaker, and furnace iron is now openly offered at \$10.50, Birmingham basis, for prompt shipment. A few second-quarter contracts have also been made at this price, but the total tonnage of these sales is comparatively insignificant. The indifference of buyers as to last half requirements is said to be more marked than ever before in the history of the trade, the general tendency being to sit still and wait developments. There are no open general inquiries, and the amount of business that is quietly under negotiation with individual firms is very small. The Hanging Rock furnaces are still holding firmly at \$13.50, Ironton, for first half shipment, but are not booking any orders except for carload lots to fill urgent requirements from nearby customers. The apathetic attitude of consumers is generally attributed to a desire to clean up on old contracts as well as to use up yard stocks before making any new obligations. This is partly borne out by the satisfactory specifications on contracts that are now coming in. The silvery irons are quiet and \$16 at furnace is considered minimum for second quarter shipment. No interest is taken in malleable iron. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft.	\$14.25 to \$14.75
Southern coke, No. 2 f'dry and 2 soft.	13.75 to 14.25
Southern coke, No. 3 foundry.	13.25 to 13.75
Southern No. 4 foundry.	12.75 to 13.25
Southern gray forge.	12.25 to 12.75
Ohio silvery, 8 per cent silicon.	17.20 to 17.70
Southern Ohio coke, No. 1.	15.70 to 16.20
Southern Ohio coke, No. 2.	14.70 to 15.20
Southern Ohio coke, No. 3.	14.45 to 14.70
Southern Ohio malleable Bessemer.	14.70 to 15.20
Basic, Northern.	14.70 to 15.20
Lake Superior charcoal.	16.25 to 17.25
Standard Southern carwheel.	27.25 to 27.75

(By Mail)

Coke.—With the possible exception of the Pocahontas district, furnace coke quotations have had a tendency to settle. Connellsville 48-hr. brands are quoted around \$1.90 to \$2 per net ton at oven, the first named price being available on contracts for delivery over the next six months. Most producers, however, are holding out for \$2, and in a few cases \$2.10 is asked. Pocahontas and Wise County furnace coke is held about 10c. or 15c. a ton higher than Connellsville. Foundry coke is very quiet, there being practically no contracting and but little spot business. Prices are held at \$2.50 to \$2.75 per net ton at oven for Connellsville and Wise County grades, and it is possible to purchase some Pocahontas at about the same figures.

Finished Material.—Although shipments on contracts continue to show some improvement, little new business is reported by the mills, except for black and galvanized sheets that are in demand for filling immediate demands. The warm weather is expected to open up a call for sheets, bars and structural shapes at an early date. In fact, the local demand for bars and small structural shapes is said to show considerable improvement, although carload orders are disappointingly slow in making an appearance. We quote No. 28 black sheets at 2.15c., f.o.b. cars Cincinnati, or Newport, Ky., and galvanized sheets at 3.15c. While it is reported that in other districts these prices could be shaded for nearby shipment, mills in this territory are not disposed to meet such prices. Store prices on steel bars remain around 1.75c. and on structural shapes 1.85c. Blue annealed sheets are quoted from stock at \$2.05 to \$2.10, based on No. 10 gauge.

Old Material.—The market is exceedingly dull. Considerable scrap has been bought at low prices and dealers are not disposed to take on heavier stocks until a better demand develops. Prices are off approximately 25c. a ton all down the line. The minimum figures given below represent what buyers are willing to pay

for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

Per Gross Ton		
Bundled sheet scrap.	\$7.00 to	\$7.50
Old iron rails.	12.00 to	12.50
Relaying rails, 50 lb. and up.	20.00 to	20.50
Rerolling steel rails.	11.00 to	11.50
Melting steel rails.	9.50 to	10.00
Old carwheels.	10.50 to	11.00

Per Net Ton		
No. 1 railroad wrought.	\$9.00 to	\$9.50
Cast borings.	4.75 to	5.25
Steel turnings.	4.75 to	5.50
No. 1 cast scrap.	9.50 to	10.00
Burnt scrap.	6.25 to	7.00
Old iron axles.	17.00 to	17.50
Locomotive tires (smooth inside).	10.00 to	10.50
Pipes and flues.	6.50 to	7.00
Malleable and steel scrap.	7.50 to	8.00
Railroad tank and sheet scrap.	5.50 to	6.00

Buffalo

BUFFALO, N. Y., March 31, 1914.

Pig Iron.—New inquiry has been of small volume and sales for the week are unprecedentedly light for the season, aggregating only about 2000 tons, all grades. The market in fact appears to be almost at a standstill so far as new buying is concerned. On the other hand shipments on existing contracts have been very heavy, one of the principal producers of the district having shipped 43,000 tons in March, and another of the large producers has been shipping steadily more than its daily production and has only a limited stock left. Charcoal iron is in fairly good demand and some grades are scarce. Producers in this line, as a rule, have well filled order books. Car wheel foundries, malleable iron works and other plants specializing in railroad supplies are reported low in orders; but it is believed that the railroads have a large volume of orders to release as soon as the rate advance question is settled. Furnace men are generally maintaining a firm attitude in their price views, and current quotations approximate those shown in the following schedule, f.o.b. Buffalo, for second quarter delivery, one furnace interest charging 25c. per ton additional for Buffalo city delivery:

No. 1 foundry.	\$14.00 to \$14.25
No. 2 X foundry.	13.50 to 14.00
No. 2 plain.	13.25 to 13.75
No. 3 foundry.	13.00 to 13.25
Gray forge.	12.75 to 13.25
Malleable.	13.75 to 14.25
Basic.	13.75 to 14.25
Charcoal, regular brands and analysis.	15.75 to 16.75
Charcoal, special brands and analysis.	20.50

Finished Iron and Steel.—New business has been of small volume but specifications on first quarter contracts were received in fair volume. The policy adopted by various agencies in the adjustment of second quarter contracts is for the present to accept specifications at first quarter prices, this policy being followed rather than making a fixed adjustment for the full quarter. While prices are being generally held at 1.25c. for steel bars, plates and shapes, it is believed that on attractive tonnages, for immediate delivery, a lower price might be obtainable. The budget speech of the finance minister of Canada has been postponed until Monday, April 6, when the policy of the administration will be determined in regard to imposing a duty on wire rods. One of the selling agencies here reports the sale of 800 tons of plates for export to Canada and inquiries from a Canadian source for 2000 tons additional. The International Railway Company of Buffalo has placed 20,400 steel ties with the Carnegie Steel Company. Bids go in to-day for the Citizen's Trust Building, Utica, N. Y., taking 175 tons. The Lackawanna Bridge Company, Buffalo, will supply the steel work for the new foundry building for the International Harvester Company at Auburn, N. Y. The same company has taken contract for the steel for a sawmill, etc., of 1000 tons for the Carpenter-O'Brien Lumber Company, Jacksonville, Fla. The general contract for the Buffalo By-Product Coke Corporation's plant at South Buffalo has been let to the Otto Coke Oven Company, 6 Church street, New York City.

Old Material.—The market is still weak. The principal local consumer has stopped shipments on contracts temporarily; but dealers anticipate a more active market shortly, and are unwilling to accept prices at present

obtainable for most of the commodities on the list, except for limited tonnages. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	\$10.00 to \$10.50
Low phosphorus steel	14.50 to 15.00
Boiler plate sheared	11.50 to 12.00
No. 1 railroad wrought scrap	11.00 to 11.50
No. 1 railroad and machinery cast scrap	11.50 to 12.00
Old steel axles	13.75 to 14.25
Old iron axles	21.50 to 22.00
Old carwheels	11.50 to 12.00
Railroad malleable	10.25 to 10.75
Machine shop turnings	5.50 to 6.00
Heavy axle turnings	7.50 to 8.25
Clean cast borings	6.00 to 6.50
Old iron rails	15.00 to 15.50
Locomotive grate bars	9.50 to 10.00
Stove plate (net tons)	9.75 to 10.00
Wrought pipe	7.50 to 8.00
Bundled sheet scrap	6.25 to 6.50
No. 1 busheling scrap	8.50 to 9.00
No. 2 busheling scrap	6.00 to 6.50
Bundled tin scrap	10.50

San Francisco

SAN FRANCISCO, CAL., March 24, 1914.

The activity which should prevail at this season is lacking, though a slight increase is noted in the jobbing trade, and in some lines a fair tonnage has been booked for shipment from mills. Small consuming industries show a gradual gain, but are still operating on much less than normal, while large orders are coming out very slowly. With merchants and mills alike anxious for business, there is little firmness as to prices. Buyers are conservative as to contracts for the second quarter, and practically nothing is being done for deliveries beyond that period. This tendency may be attributed in part to the stock carried here by leading manufacturing interests, which may be drawn upon in case of a shortage. A good all-round consuming demand is expected next month, as considerable building and contract work is to be started at that time.

Bars.—A fair jobbing business has been done recently in soft steel bars and merchants have taken a considerable tonnage from manufacturers' stocks, notwithstanding foreign competition. Larger arrivals of foreign steel will, however, probably curtail the movement of American bars for some time. A new low figure has recently been put out on Belgian bars, amounting to about 1.40c., duty paid; but so far German bars at about 1.50c. seem to have the preference, and buyers are cautious about placing any new orders for import. While several good-sized building orders have been placed, the tonnage of material for concrete reinforcement is not satisfactory, and competition in this line has been very close.

Structural Material.—The active movement that took place early this month has been followed by renewed dullness. No contracts of importance have been closed in the last fortnight, and nothing of special interest is being figured at the moment. The small jobs in prospect, however, are expected to give a fair tonnage, and most of the local contractors are in better shape than for some time.

Rails.—Business in standard sections has been confined to a few small and scattering orders, but the prospect of rather large arrivals of foreign stock has not prevented the placing of a good aggregate of light rails. Conditions in the mining districts are favorable for the near future. Most inquiries, however, are subject to strong competition, and prices are low. Some of the street railroad lines are expected in the market shortly for grooved girder rails.

Plates.—Manufacturers are receiving a considerable tonnage on old contracts for work in hand, and tank and pipe construction contracts are coming out at frequent intervals, giving rise to a moderate amount of new business. Consumers, however, are limiting their purchases rather closely to known requirements, and merchants show little interest. The distributive trade is improving, though small shops in this vicinity are not as busy as they should be. The Willamette Steel Works, Portland, has a contract for about 1500 tons of riveted pipe for delivery at Juneau, Alaska. It is reported that 3½ miles of siphon on the Los Angeles aqueduct will have to be replaced, and the Union Oil

Company is preparing for a lot of tank work in the Fullerton district.

Sheets.—Blue annealed and black sheets remain quiet, but there is a better demand for galvanized in the building trades, and some business is coming from manufacturers of irrigation specialties. The tonnage is hardly up to expectations, but current specifications are increasing.

Standard Pipe.—The spurt in oil-field supplies early this month was of short duration, though the outlook in this line is good. Local plumbing supply dealers report business below normal, and are buying but little. The most unsatisfactory feature is the competitive situation, as merchants have for some time been selling pipe practically at cost.

Cast-Iron Pipe.—Orders have been placed for the three Arizona inquiries, Tucson taking about six car-loads. No other municipal business has been booked, but inquiries for both public and private work are coming out more freely than for some time, and there is a firmer tendency as to prices. San Diego is working on specifications for a large tonnage, for which bonds will be sold shortly.

Pig Iron.—No material change is noted in the local situation. Small orders for delivery from store are a little more numerous, but the movement is still slow, the principal melters being well supplied. A considerable tonnage is held by importers, and prices are hardly well enough established to justify quotations. Buyers are refusing to place any orders for extended delivery, as a material change in prices, and possibly in the relative values of foreign and Southern iron, is expected when the Panama Canal is completed.

Coke.—Some increase is noted in deliveries from the local yards, but spot offerings are ample for all nearby requirements, and no improvement has taken place in values. The prospect of a change in rates via Panama deters buyers from contracting for current or future loading at European ports.

Old Material.—The local scrap market is quiet. Occasional small sales of cast-iron scrap are reported at about \$16.50 per net ton, but there is no large demand. Steel-melting scrap is not moving to any extent, and a considerable tonnage has accumulated. Dealers hold a light tonnage of rerolling rails at \$16 or over, but there has been no movement of late. Sales of heavy relaying rails are reported at \$30 per net ton.

St. Louis

ST. LOUIS, Mo., March 30, 1914.

Pig Iron.—Demand has been confined for the most part to small lots. Melters are taking contract allotments without hesitancy and there is no more request for holding up shipments than is to be found at even the busiest period. Under these conditions furnace representatives are convinced that the early year purchases, which covered requirements up to July, will be used and that June at the very latest will bring about renewed buying, while any change in the general situation would start it earlier. The only inquiries unfilled are two for 500 tons each, one for Virginia iron of high manganese and the other for No. 2 Southern. Prices are held steadily at \$11 for No. 2 Southern and \$13.25 for Ohio iron, Birmingham and Ironton basis respectively. Chicago No. 2 X is quiet at \$14 to \$14.50.

Coke.—New business has been for carloads and similarly small lots for immediate shipment and allotments on contract are going forward steadily. By-product coke is steadily held at the Connellsville basis.

Finished Iron and Steel.—The volume of business shows an improvement over recent weeks. The agricultural implement trade is showing up better, there being evidence that the stocks accumulated as a result of last fall's drought have been worked off to a sufficient extent to indicate that buying for the coming season will not be below a reasonable normal. The largest fabricating contract for the week was for 140 tons for a local interest. Bars, both ordinary and reinforcing types, are moving fairly well.

Old Material.—The scrap market is sick and the mark-off for the week extends all through the list. No demands from the rolling mills or steel mills are coming in, with the result that prices really represent little. Dealers are buying only to meet contracts, but brokers are reported taking railroad material, paying for it and then leaving it in the hands of the roads to await change in the market. The only lists closing this week are 2000 tons from the Frisco and 1500 tons from the Missouri Pacific, both of which are scheduled to go at very low figures. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton

Old iron rails	\$10.75 to \$11.25
Old steel rails, rerolling	11.00 to 11.50
Old steel rails, less than 3 feet	9.75 to 10.25
Relaying rails, standard section, subject to inspection	21.00 to 23.00
Old carwheels	9.75 to 10.25
No. 1 railroad heavy melting steel scrap	9.75 to 10.25
Shoveling steel	8.25 to 8.75
Frogs, switches and guards cut apart	9.75 to 10.25
Bundled sheet scrap	3.75 to 4.25

Per Net Ton

Iron angle bars	\$10.25 to \$10.75
Steel angle bars	8.50 to 9.00
Iron car axles	16.75 to 17.25
Steel car axles	11.75 to 12.25
Wrought arch bars and transoms	11.25 to 11.75
No. 1 railroad wrought	7.75 to 8.25
No. 2 railroad wrought	7.50 to 8.00
Railroad springs	8.50 to 9.00
Steel couplers and knuckles	8.25 to 8.75
Locomotive tires, 42 in. and over, smooth	8.75 to 9.25
No. 1 dealers' forge	7.25 to 7.75
Mixed borings	3.25 to 3.75
No. 1 busheling	7.25 to 7.75
No. 1 boilers, cut to sheets and rings	5.50 to 6.00
No. 1 cast scrap	9.25 to 9.75
Stove plate and light cast scrap	7.75 to 8.25
Railroad malleable	7.50 to 8.00
Agricultural malleable	7.00 to 7.50
Pipes and flues	5.50 to 6.00
Railroad sheet and tank scrap	5.75 to 6.25
Railroad grate bars	6.75 to 7.25
Machine shop turnings	4.25 to 4.75

New York

NEW YORK, April 1, 1914.

Pig Iron.—Rarely has the local market been quieter. An inquiry for 3000 tons is reported to have come up from a company having its buying headquarters in New York. If the purchase is made shipments will be made to other than near-by districts and Southern iron will probably be taken. A New Jersey inquiry for 1000 tons for a machinery foundry is still pending, but the report that a New Jersey foundry at tidewater will buy a round lot is without foundation. In the last named instance iron was bought last year which will last pretty well through 1914. A small business has been done in New England, including some Virginia iron, prices on the latter being around a \$12.75 furnace basis for No. 2 X. Nothing is heard of plans for increasing foundry operations with the arrival of open weather. Makers of water and gas and sanitary pipe are doing better than the average foundry in other lines. From all present indications the waiting attitude of buyers of foundry iron will continue for some weeks. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, \$15.25 to \$15.50; No. 2 X, \$14.75 to \$15; No. 2 plain, \$14.50 to \$14.75. Southern iron is on the basis of \$15.25 to \$15.50 for No. 1 and \$14.75 to \$15.25 for No. 2.

Finished Iron and Steel.—The business moving represents fair specifications on contracts and considerable that is urgent. All the signs indicate that little of the steel produced since the first of the year has gone into stocks, and hence the apathy now for some time shown by buyers is damming up a demand which the present softness in price would appear to be attracting into definite orders. So far the new price level has not brought out much, although all of the companies are not willing to sell at this level, which is 1.15c., Pittsburgh, for steel bars as well as plates and shapes. In

fact it is hardly true to state that there is a definite market price for these lines of finished materials. For example, a recent quotation on what may be termed quality plates, plates carrying extras, showed a difference in the price of at least two companies of \$5 per ton, and following the reference in the last two issues to plate business involving several thousand tons at a price about \$3 a ton under recent quotations, comes news of quotations for plates to a manufacturing consumer at 1.10c., Pittsburgh. Few new offerings were learned of, but there are between 10,000 and 11,000 cars being actively considered, as recently listed in this column; for the Illinois Central, Chicago Northwestern, the Bessemer & Lake Erie, the Duluth, Missabe & Northern, the St. Louis, Brownsville & Mexico, the Great Northern and the Denver & Rio Grande. Bids are to be taken April 14 for the New York Board of Water Supply for 2700 tons of riveted steel pipe, 66 in. in diameter. Some of the structural awards since the last issue include: 450 tons for the Franklin Square House addition, Boston, to the New England Structural Company; 400 tons for beam bridges for the Maryland & Pennsylvania, to the Phoenix Bridge Works; 230 tons for the Pennsylvania, to Fort Pitt Bridge Works and 240 tons for the Pennsylvania, to Lewis F. Shoemaker & Co. A building for the Hippodrome Company, Baltimore, 700 tons, has been closed. A large building for the Rogers Peet Company, Fifth avenue and Forty-first street, is expected shortly in the market and it is understood that a round tonnage of reinforcing steel will be needed for the National Carbon Company, Brooklyn, for a large factory building to be built of concrete. The Southern Railroad has bought 50 passenger cars, 40 of the Pressed Steel Car Company and 10 of the American Car & Foundry Company, and the Central Railroad of Georgia has closed for 500 box cars. We quote mill shipments of steel bars, plates and structural material at 1.15c. to 1.20c., Pittsburgh, or 1.31c. to 1.36c., New York, and iron bars, 1.25c. to 1.35c., New York. We quote iron and steel bars from store at 1.90c. to 1.95c. and shapes and plates, 1.95c. to 2c.

Ferroalloys.—Extreme quietness characterizes the market for 80 per cent. ferromanganese. Since last report a lot of 200 tons has been sold at about \$39, seaboard, which is still the quotation, but aside from this there has been practically no business, even in small lots. Conditions are about the same in the 50 per cent. ferrosilicon market, quotations remaining at \$73, Pittsburgh, for carloads; \$72 for 100 tons and \$71 for 600 tons or over.

Cast-Iron Pipe.—The lowest bidder on 680 tons of 6 to 12 in., on which bids were opened March 30 at Fall River, Mass., was an eastern Pennsylvania firm, which named \$20.90 per net ton, delivered, for the entire quantity. The next highest bidder named \$21.35, and other bids ranged from \$21.45 to \$23.45. Westerly, R. I., will open bids April 4 on 275 tons, principally 6 in. Municipal lettings are few this week, and private buying is much less animated than it has been. Carload lots of 6 in. continue to be quoted at \$22 to \$23, per net ton, tidewater.

Old Material.—Inquiry for relaying rails is more active. Melters of scrap, however, show little interest in the market. Transactions are few and far apart. The outlook presents practically no indication of an early improvement in the demand. Prices are lower, and dealers are of the opinion that they may go still lower. It is expected that the supply of scrap will rapidly increase. The severe snow storms which checked the collection of scrap in February and March thus held back considerable quantities from the market which are now becoming available. The financial condition of the railroads is also the subject of comment in this connection, as they are likely to press their accumulations of scrap on the market to secure cash. Old carwheels have become exceedingly plentiful, large quantities being now pressed for sale. Another consideration with regard to the supply of scrap is that, with this material now on the free list, holders in other countries are looking to the United States for a market and offers are being solicited. A leading broker in this

city has been asked to make a bid on a very large quantity now held in a South American city. Dealers' quotations are as follows, per gross ton, New York:

old girder and T rails for melting.....	\$8.25 to \$8.75
Heavy mounting steel scrap.....	8.25 to 8.75
Bolting rails.....	21.50 to 22.00
Bolting rails.....	10.50 to 11.00
Iron car axles.....	18.50 to 19.00
Steel car axles.....	12.50 to 13.00
No. 3 railroad wrought.....	10.50 to 11.00
No. 3 railroad wrought.....	9.50 to 10.00
Wrought-iron track scrap.....	8.75 to 9.25
No. 1 yard wrought, long.....	8.25 to 8.75
No. 1 yard wrought, short.....	3.25 to 3.50
Light iron.....	5.75 to 6.25
Cast iron.....	5.75 to 6.25
Wrought turnings.....	8.25 to 8.75
Wrought pipe.....	10.50 to 11.00
Carwheels.....	11.00 to 11.50
No. 1 heavy cast, broken up.....	8.00 to 8.50
Stove plate.....	6.50 to 7.00
Locomotive grate bars.....	7.75 to 8.25
Malleable cast.....	

British Trade Very Quiet

Colliers' Strike May Affect Pig Iron by Reducing the Coke Supply

(By Cable)

LONDON, ENGLAND, April 1, 1914.

The situation shows no material change anywhere. Pig iron is steady to firm, and the colliers' strike in South Yorkshire is regarded with some anxiety as tending to a further reduction in the coke supply. The total number of blast furnaces active is 171, compared with 206 a year ago. Semi-finished steel is dull, the French being still the cheapest sellers. Finished steel is quiet. The Clyde shipbuilding output in March was 27,400 tons, which is the smallest since 1909. Stocks of pig iron in Connal's stores are 121,998 gross tons, against 125,479 tons one week ago. We quote as follows:

Tin plates, coke, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 13s. (\$3.16).

The following prices are per ton of 2240 lb.:

Cleveland pig-iron warrants (Tuesday), 50s. 8½d. (\$12.33), against 50s. 8d. (\$12.32) one week ago.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 51s. (\$12.41).

Hematite pig iron, f.o.b. Tees, 62s. (\$15.09).

Steel sheet bars (Welsh), delivered at works in Swansea Valley, £4 10s. (\$21.89).

Steel bars, export, f.o.b. Clyde, £6 (\$29.20).

Steel joists, 15-in., export, f.o.b. Hull or Grimsby, £5 15s. (\$27.98).

Steel ship plates, Scotch, delivered local yards, £5 17s. 6d. (\$28.59).

Steel black sheets, No. 28, export, f.o.b. Liverpool, £8 15s. (\$42.58).

Steel rails, export, f.o.b. works port, £5 15s. (\$27.98).

The following prices are per export ton of 1015 kilos, equivalent to 2237.669 lb.:

German sheet bars, f.o.b. Antwerp, 81s. (\$19.70).

German 2-in. billets, f.o.b. Antwerp, 76s. (\$18.48).

German basic steel bars, f.o.b. Antwerp, £4 8s. (\$21.41).

German joists, f.o.b. Antwerp, £5 2s. to £5 5s. (\$24.82 to \$25.55).

Continental Steel Companies Cutting Prices—American Makers Not Active

(By Mail)

LONDON, March 20, 1914.

Under all the conditions of political and financial gloom which have come into evidence within the past month, it is little short of remarkable that prices of pig iron should have been kept upon their really rather satisfactory level. There has not been any support of a concerted character in the market, and yet whatever was offered was taken up readily enough and actually within the last few days there has been a tendency towards a higher level. The fact that the movement amounts to only a few coppers is nothing against the

market, for these be the days of small things and little mercies are just now the most that can be expected. The statistical position of Cleveland iron has improved again and stocks stand at a remarkably low level. From inquiries which have been made by leading interests here it appears also that the makers have had their private stocks reduced since the year opened by upwards of 20,000 tons. This means that in all essentials Cleveland pig iron stands on a very sound basis, and any way, makers being well booked, show no desire to sell. The tendency at the moment on the part of buyers is to hold back, awaiting the development of the spring trade, buying in connection with which is nearly due now. Prices look very much as if they would hover between 50s. 3d. (\$12.22) and 51s. 3d. (\$12.47) for cash No. 3 Cleveland for some time yet, and a firm market would no doubt induce a more accommodating attitude on the part of buyers, whose operations have been deterred by the flabby conditions ruling nearly everywhere. More buying has been done lately for export, and the shipments from the tees have improved.

Bad Conditions in Finished Steel.

The position of the finished iron trade is eminently unsatisfactory, prices being miserably low and the full blast of foreign competition is being encountered. As long as Belgian works will sell their iron at 85s. (\$20.66) to 87s. (\$20.91), f.o.b., as they are doing, it is hopeless for the British makers to talk of 120s. (\$29.20) or so as the price of their material. The finished iron trade is indeed very unsatisfactory.

In steel the position is rather complicated by a battle royal between the Scotch and North East of England associations, which bodies carve out the territory between themselves and arrange spheres of action. In Scotland there has been a lot of friction owing to seceding members, and with vigorous German competition for business in ship plates on the Clyde the position of the Scottish steel masters has been rendered impossible. While they were fiddling, however, Germany was taking the orders, and now that the damage has been done, in part at all events, some of the Scotch works want to reduce the selling price to avoid worse befalling them, but others oppose this policy. On the other hand the North East Coast steel makers, finding that they can sell plates at current prices, do not want any reduction and they threaten reprisals if the Scotch Association cuts rates. There is a meeting to be held to look for a way out. [The breaking up of the pool, as the result of this meeting, was cabled by our correspondent March 24.—EDITOR.] British steel prices for finished material have been in a number of directions too high compared with those ruling on the Continent. Wherever the Germans can get a decently low freight they are after all the business to be picked up.

Continental steel is weak, but semi-finished steel cannot fall much below the present basis of about 73s. (\$17.76) for 4-in. billets, 75s. (\$18.25) for 2-in. and 78s. (\$18.98) to 80s. (\$19.47), f.o.b., for sheet bars. There is not any buying, however, consumers being full for the time being. Russia is inquiring for 80,000 tons of billets, the works there being congested, and there is a chance of a temporary withdrawal of the duty to permit of imports. If the business is done it will probably go to Germany. America has been invited to quote, but some makers in the United States who have been approached do not handle the inquiries sent them in a way that inspires confidence as to their serious business intentions. European merchants cabling to American manufacturers for firm quotations for definite tonnages are not pleased at being kept waiting a week or so for a reply and then being invited to name a price themselves.

The office of the Earle Gear & Machine Company formerly located at 90 West street, New York City, has been consolidated with the general office at Stenton and Wyoming avenues, Philadelphia. All correspondence regarding matters handled in the past by the New York office should be sent to Philadelphia in the future.

German Conditions Unimproved

Consumers Still Defer Buying—Combinations Feel the Strain of Poor Business

BERLIN, March 20, 1914.—Reports from the trade this week are again unfavorable. From all sections it is mentioned that the usual spring improvement has failed to materialize. Consumers are everywhere holding off, hoping to buy more cheaply later on; hence, bookings continue light. Calls for shipments on order are also slack, and the amount of work in hand is gradually shrinking.

Some uncertainty has also been caused in the trade this week by matters of organization. The export combination in carwheels has been denounced by Hugo Stinnes. Besides being the president of the great Deutsch-Luxemburg company, he owns a carwheel establishment at Dortmund, which he has latterly so far developed in producing capacity that he demanded 20 per cent. of the expert trade. The other makers refused to listen to this and he gave notice of his withdrawal from the combination. The Deutsch-Luxemburg company has also caused a flurry by dissolving its contract with the Rhenish-Westphalian Beam Association in regard to Grey girders of 20 in. height and more. As it has had control of the American patents for this specialty, it was till recently the only manufacturer of such heavy beams in Germany, but not long ago Thyssen's new works at Hagendingen, Lorraine, began to make them and has been offering them at 123.50 marks (\$29.39) a ton. This gave occasion for Deutsch-Luxemburg's action.

While the general tendency in the home trade is downward, no actual reductions, apparently, have occurred this week. For the export trade, on the other hand, lower prices are quoted by the Cologne Gazette. According to a dispatch of yesterday, bars have been reduced from 89 to 88s. (\$21.66 to \$21.42), and rivet bars from 91 to 90s. (\$22.15 to \$21.89) f.o.b. Antwerp. It is mentioned that Belgian works are selling heavy plates for export at 95 to 96s. (\$23.12 to \$23.36), and thin plates at 98 to 101s. (\$23.85 to \$24.51). If this report be true, it means a further considerable fall on thin plates since Saturday, when a reduction of 2s. (49c.) to 104s. (\$25.30) was reported by wire.

From the Siegerland district the prospects for the ore trade this year are reported as being less favorable. A number of the furnaces there have sold their pig-iron allotments in the Syndicate to more favorably situated producers and have shut down.

The unfavorable conditions prevailing in the plate trade for nearly a year are now being reflected in company reports. This week a bad impression has been made on the stock market by the announcement that the Baroper Walzwerk, which paid a dividend of 10 per cent. for 1912, will pass its dividend altogether for 1913; and the Schultz-Knaudt concern has just announced a dividend of only 4 per cent., which compares with 8 per cent. for 1912. Other plate mills are also expected to reduce their distribution.

Metal Market

NEW YORK, April 1, 1914.

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York	Electro-	Tin, New York	Lead, New York	Spelter, St. Louis
Mar. 25	14.87 1/2	14.50	38.50	3.90	3.77 1/2
26	14.87 1/2	14.50	38.35	3.90	3.77 1/2
27	14.87 1/2	14.50	38.25	3.90	3.77 1/2
28	14.87 1/2	14.50	38.15	3.90	3.77 1/2
30	14.87 1/2	14.37 1/2	37.90	3.80	3.67 1/2
31	14.87 1/2	14.37 1/2	37.90	3.80	3.70

In copper there has been less buying and electrolytic can be had at lower figures. Tin has been quiet and quotations have declined. Lead has dropped 20 points and buying of both small and large quantities has been done. Spelter is quiet and its tone is easier. Antimony is dull.

New York

Copper.—Taking the week as a whole the market has been quiet with not much interest shown by either foreign or domestic buyers. Yesterday was an exception in that European inquiries were better and sales were made. Until Monday, sellers were holding electrolytic with seeming firmness at 14.50c., cash, New York, but on that day price cutting began and 14.37 1/2c. was quoted, this price prevailing yesterday, also. Inquiries made on Monday showed that several of the smaller sellers were comfortably sold up for April delivery and well into May. Some agencies are adhering to 14.62 1/2c., 30 days, delivered, or 14.50c., cash, New York. Copper exports in March reached the record breaking total of 44,898 tons, and this amount may be increased a little by later returns. Prime Lake copper continues nominal at 14.87 1/2c. to 15c., cash, and is difficult to secure except in the case of occasional lots for delivery in May or later. Lower grades have sold at 14.75c. A local mill rolling sheet copper is keeping fairly busy, but is confronted with the constant possibility of catching up with orders in two or three days' time. Quotations in London to-day are £65 12s. 6d. for spot and £66 for futures.

Tin.—The situation is a quiet, drifting one with no forces tending to push the market either up or down. Very little interest is shown in futures, and this is held responsible for a decline which has been going on for several days. The Banca sale, which took place in Holland March 26, 2300 tons being sold, realized 108 1/2 florins, equivalent to 39.60c., c.i.f. New York, which was a full price. Since then, as already indicated, the market has sagged. The March deliveries into domestic consumption were good and fully up to expectations, totaling 4450 tons. In stock and landing March 31 was 1997 tons. Arrivals in the month totaled 4893 tons and there was afloat yesterday 3872 tons. The London quotations to-day are £173 5s. for spot and £174 15s. for futures.

Lead.—On March 25 the American Smelting & Refining Company reduced its price 10c. per 100 lb., making the New York quotation 3.90c., while St. Louis came down to 3.77 1/2c. On Monday there was another reduction of 10c. per 100 lb., or to 3.80c. per lb., New York. St. Louis on that day declined to 3.67 1/2c., but yesterday the Western price went up 2 1/2 points to 3.70c. Following the first reduction there was an improved demand and better business for small and moderate-sized lots, while the second cut brought about sales of large lots. At the present time the market is quiet. The only reasons that are seen for the declines are the extreme dullness which had prevailed and the declining market abroad. A week ago the London quotation was £19 7s. 6d., whereas to-day it is £18. One effect of lower prices abroad will be to terminate the exports from this country which have been on the increase since the beginning of the year and a further effect will be the accumulation of stocks here unless domestic demand becomes much better. The situation, therefore, is one of uncertainty.

Spelter.—The market is quiet, the quotations yesterday being about 5.27 1/2c., New York, and 5.12 1/2c., St. Louis. The tone is easier.

Antimony.—The dullness which has characterized antimony for several weeks continues and quotations are unchanged at 6.75c. to 7c. for Hallett's, 7.20c. to 7.25c. for Cookson's and 5.75c. to 6.25c. for Chinese and Hungarian grades.

Old Metals.—Trade has again become quiet. Dealers' selling prices, however, are unchanged as follows:

	Cents per lb.
Copper, heavy and crucible	13.75 to 14.00
Copper, heavy and wire	13.25 to 13.50
Copper, light and bottoms	12.75 to 13.00
Brass, heavy	9.00 to 9.25
Brass, light	7.75 to 8.00
Heavy machine composition	12.25 to 12.50
Clean brass turnings	8.75 to 9.00
Composition turnings	11.25 to 11.50
Lead, heavy	3.75
Lead, tea	3.50
Zinc scrap	4.25

Chicago

MARCH 30.—Moderate activity in the buying of copper, accompanied by a somewhat stiffer tone in prices, represents the best that can be said of the market. The

leading interest has reduced the price of lead and tin quotations are again lower. We quote as follows: Casting copper, 14.50c. to 14.75c.; Lake copper, 15c., for prompt shipment; small lots, 1/4c. to 1/2c. higher; pig tin, carloads, 38.75c.; small lots, 40.75c.; lead, desilverized, 3.90c., and corroding, 4.20c., for 50-ton lots; in carloads, 2 1/2c. per 100 lb. higher; spelter, 5.20c.; Cookson's antimony, 9.50c. for cask lots; other grades, 8c.; sheet zinc, \$7, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 12c.; copper bottoms, 11c.; copper clips, 11.25c.; red brass, 11.25c.; yellow brass, 8.25c.; lead pipe, 3.50c.; zinc, 3.50c.; pewter, No. 1, 25c.; tinfoil, 28c.; block tin pipe, 31c.

St. Louis

MARCH 29.—The metal market has been dull during the week, particularly in the Missouri product. Lead closed to-day at 3.75c.; spelter, 5.12 1/2c.; tin, 38.57 1/2c. to 38.67 1/2c.; Lake copper, 15.35c.; electrolytic copper, 14.97 1/2c.; Cookson's antimony, 7.60c. The tone of the Joplin ore market was in consonance with the metal market and prices were not well sustained. The range on 60 per cent. ore was \$36 to \$40 per ton with the top price \$43. Calamine ore sold on the 40 per cent. metal basis ranged from \$19 to \$21, with the highest settlements at \$26. Lead ore showed the greatest weakness, the sales made on the basis of 80 per cent. metal having been at \$48. We quote miscellaneous scrap metals as follows: Light brass, 6.50c.; heavy yellow brass, 8c.; heavy red brass, 10c.; heavy copper and copper wire, 11c.; zinc, 3.50c.; lead, 3.50c.; pewter, 26c.; tinfoil, 31c.; tea lead, 3c.

Iron and Industrial Stocks

NEW YORK, April 1, 1914.

The stock market has been inclined to weakness, awaiting some decision in the Eastern railroad rate case. Rumors from Washington vary almost from day to day, sometimes predicting an early decision and at other times indicating that the Interstate Commerce Commission is in no hurry. Meanwhile the stock market awaits some favorable development which may give it an upward impulse. Efforts of those who are working for lower stock prices seem to be unsuccessful in accomplishing much. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., com. 12 - 12 1/2%	Pressed St'l, com. 43 1/4 - 44 1/2%
Allis-Chal., pref. 46 - 46 1/2	Pressed St'l, pref. 104
Am. Can., com. 28 1/2 - 30 1/2	Ry. Spring, com. 28 - 30 1/2
Am. Can., pref. 91 1/4 - 93	Ry. Spring, pref. 95 1/2 - 96 1/2
Am. Car & Fdy., com. 49 1/2 - 52	Republic, com. 23 - 25 1/4
Am. Car & Fdy., pref. 116 - 117 1/2	Republic, pref. 86 - 88 1/2
Am. Loco., com. 33 1/2 - 34 1/2	Rumely Co., com. 9 1/4 - 10 1/2
Am. Loco., pref. 101 1/2 - 102 1/2	Rumely Co., pref. 26 - 28
Am. Steel Forges, 32 1/2 - 34	Sloss, com. 30 - 31 1/2
Bald. Loco., com. 50 1/2 - 50 1/2	Pipe, pref. 40 1/2 - 42
Bald. Loco., pref. 108 - 108 1/2	U. S. Steel, com. 62 1/2 - 64 1/2
Beth. Steel, com. 40 1/4 - 42 1/2	U. S. Steel, pref. 109 1/2 - 110 1/4
Beth. Steel, pref. 82 1/4 - 84 1/2	Va. I. C. & Coke 50 - 51 1/4
Colorado Fuel, 32 - 33 1/2	West'g'h'se Elec. 75 - 76 1/4
Deere & Co., pref. 95 1/4 - 95 1/2	Am. Ship, com. 30 - 31
General Electric, 144 1/4 - 147	Chic. Pneu. Tool 57 1/2 - 58 1/2
St. N. Ore Cert. 35 1/4 - 36 1/2	Cambria Steel, 49 1/4 - 50
Int. Harv., com. 104 1/2 - 105 1/2	Lake Sup. Corp. 21 1/4
Int. Harv., pref. 116	Pa. Steel, pref. 66 1/2 - 66 1/2
Int. Harv., Corp. 104 - 105 1/2	Cruc. Steel, com. 15 - 16 1/2
Lackawanna St'l 34 1/4 - 35	Cruc. Steel, pref. 89 - 92 1/2
Nat. En. & St., com. 11 - 12	Harb. Walk. Ref., com. 42
Pgh. Steel, pref. 90 - 91	Harb. Walk. Ref., pref. 99
La Belle Iron, com. 41 1/4 - 41 1/2	La Belle Iron, com. 41 1/4 - 41 1/2

Dividends Declared

The Chicago Pneumatic Tool Company, regular quarterly, 1 per cent., payable April 25.

The Hendee Mfg. Company, regular quarterly, 1 1/2 per cent. on the preferred stock, payable April 1.

The Sharon Steel Hoop Company, regular quarterly, 1 1/4 per cent., payable April 1.

The American Screw Company, regular quarterly, 1 1/2 per cent., payable March 31.

The Canadian Car & Foundry Company, regular quarterly, 1 1/4 per cent. on the preferred stock, payable April 25.

The Pittsburgh Coal Company, regular quarterly, 1 1/4 per cent. on the preferred stock, payable April 25.

The Westinghouse Electric & Mfg. Company, regular quarterly, 1 1/4 per cent. on the preferred stock, payable April 15, and 1 per cent. on the common stock, payable April 30.

According to the Department of Labor, 23 States have thus far enacted workmen's compensation laws. These laws have in some instances been the subject of adjudication and the States in which they have been declared constitutional by the courts of last resort are Massachusetts, New Jersey, Ohio, Washington and Wisconsin. The Montana law was declared invalid because it permitted a double liability and the New York law because it was held to be in conflict with the constitution of the State. A new law was passed in New York, however, which now meets the constitutional requirements. The report of the department states that it is worthy of note that no country has so far returned to the liability system after having enacted a compensation law.

The Cowan Truck Company, Holyoke, Mass., is notifying the trade that the Patent Office has rendered a decision that George P. Taylor, of that company, is the prior inventor and patentee of an elevating truck, of which a similar one has been placed on the market by another company. The decision awards priority of invention to Mr. Taylor and decides that the patent containing the broad claims covering both trucks should issue to the Cowan Truck Company, whose truck is known as the Cowan Transveyor.

Corrigan, McKinney & Co., Cleveland, Ohio, will shortly ask for bids for the equipment for a steam power plant to be erected in connection with its new steel works. It will probably be equipped with three 7000-kw. turbo-generators and an additional 7000-kw. unit will be installed later. The equipment to be purchased will also include boilers, stokers, pumping machinery, condensers and coal and ash-handling apparatus. Plans are well under way for this firm's two new blast furnaces and it is the present intention to ask for bids on the steel work within the next few weeks.

The Cleveland Punch & Shear Works Company, Cleveland, Ohio, is building three large shears for the new plate mill of the Otis Steel Company in that city. One has a capacity for shearing a plate 13 ft. in width and 1 in. thick at one stroke; one, 13 ft. wide, 3/4 in. thick; and the third, 84 in. wide and 1 1/4 in. thick. The same company has recently taken an order from the Cambria Steel Company for a large combination punch and shear to be used as a tie-plate and splice-bar machine.

Plans for the proposed \$500,000 experiment station of the United States Bureau of Mines to be located in Pittsburgh, have been approved by the commission appointed by Congress. The Federal Government now owns the property upon which will be erected a group of buildings for the mine safety work and other investigations of the Bureau of Mines. On one side the bureau's buildings will face the great group of structures of the Carnegie School of Technology. On another side is the Carnegie Institute.

The annual election of officers of the New York Metal Exchange was held March 30, with the following result: President, A. B. Hall; vice-president, Edwin Groves; treasurer, Robert L. Crooke.

The Eastern Steel Company blew in its No. 2 Warwick furnace at Pottstown, Pa., March 23, and now has two furnaces in blast.

The Lima Locomotive Corporation, Lima, Ohio, has just booked an order for 54 locomotives from the Union Pacific Railroad.

The Standard Gas Power Company has moved its offices to the Whitehall Building, 17 Battery Place, New York City.

Personal

Henry Phipps, who has been identified with the United States Steel Corporation since its organization, has resigned from the board of directors and also as a member of the finance committee. James A. Farrell, president of the corporation, takes the place on the finance committee made vacant by the resignation of Mr. Phipps.

James N. Wallace, president Central Trust Company, New York City, has been elected a director of the Westinghouse Electric & Mfg. Company, succeeding Thomas W. Lamont, resigned, and H. H. Westinghouse has been elected a director, succeeding the late George Westinghouse.

Carl G. Barth, Philadelphia, is to address a meeting of the Western Efficiency Society, Chicago, on April 24.

Edward L. Ryerson, Jr., works manager of Joseph T. Ryerson & Son, Chicago, and W. A. Grieves, supervisor of employment and welfare, Jeffrey Mfg. Company, Columbus, Ohio, are members of the editorial board of the magazine of the Efficiency Company, known as "100 Per Cent."

Dr. Richard Moldenke, Watchung, N. J., recently sailed for Europe and will be absent until the early part of May. As chairman of the Committee on Cast Iron of the American Society for Testing Materials he will take part in the presentation of the international specifications at a meeting of the Council of the International Association for Testing Materials to be held at Turin, April 4.

Theodore W. Robinson, first vice-president Illinois Steel Company, is recovering from an operation for appendicitis. He will spend a few weeks in the South recuperating.

W. C. Thompson, formerly president Independent Harvester Company, Plano, Ill., has organized the Illinois Spring & Stamping Company, occupying a plant at 2337 North Keystone avenue, Chicago. The company will manufacture wire springs and small stampings for agricultural implements.

Alexander Potter, consulting engineer, 30 Church street, New York, has returned from a seven weeks' trip abroad. In the interest of an irrigation project, he visited plants where Diesel engines and the Humphrey pump are made.

E. L. Messler, formerly with the Jones & Laughlin Steel Company, as general superintendent of its Pittsburgh coke ovens, blast furnaces and ingot mold foundry, and for the past two years assistant to the president of the Riter-Conley Mfg. Company, is no longer associated with the latter. He has as yet not decided what line of work he will follow. His present address is in care of the Duquesne Club, Pittsburgh, Pa.

The Republic Iron & Steel Company announces appointments for its Western mills, which take Oscar Black from Moline to East Chicago as superintendent, succeeding James P. English, resigned, and make William P. Mullane superintendent at the Sylvan works, succeeding Mr. Black.

Dr. Thomas P. Darlington, secretary of the welfare committee of the American Iron and Steel Institute, delivered an interesting talk before the Illinois Manufacturer's Association at Chicago, March 25. Facilities that contribute to health and proper hygiene for the employees are to be advocated, he contended, if for no other than the reason of dollars and cents.

E. C. Welborn, formerly assistant treasurer of the Allis-Chalmers Company, has become associated with the Illinois Steel Company in the credit department.

Edward B. Busby, for the past four years sales manager of the Anderson Forge & Machine Company, Detroit, Mich., has been appointed general sales manager for the Ferro Machine & Foundry Company, Cleveland, Ohio. The experience which he has had in the automobile trade and its allied industries, as well as stationary and marine gasoline engines and the gasoline tractor business, will be of much value in his new connection. Mr. Busby was with the Midvale

Steel Company, Philadelphia, at the time when it and other steel companies were introducing to engineers the alloy steels, such as chrome nickel, nickel steel, etc.

Thomas B. Lavey, who has been for the past seven years superintendent of Isaac G. Johnson & Co.'s plant at Spuyten Duyvil, N. Y., is now general superintendent of the Standard Steel Castings Company, Cleveland, Ohio. This company has just added to its plant a shop 80 x 253 ft. and has installed another two-ton converter. It now has a capacity of 25 tons per day of products ranging in weight from one to 1000 lb.

F. A. Scott, secretary-treasurer of the Warner & Swasey Company, Cleveland, Ohio, and A. C. Cook, who is to take up his new duties as general sales manager of that company April 1, returned from Europe March 25.

Directors of the Harrisburg Foundry & Machine Works, Harrisburg, Pa., have elected Christian W. Lynch, former treasurer of Dauphin County and identified with a number of enterprises, as president and general manager. He succeeds David Fleming, who remains on the board of directors. Mr. Lynch was president of the Hickok Mfg. Company for several years and of the Paxtang Electric Company, of Harrisburg. W. P. MacKenzie was elected vice-president and sales manager; B. E. Taylor, secretary and treasurer, and George A. Hall, superintendent.

William P. Thornton, for some years engineer in the plate department of the Riter-Conley Mfg. Company, Pittsburgh, has resigned to accept a similar position with the M. H. Treadwell Company, 130 Cedar street, New York City.

O. P. Wilson, formerly of the purchasing department of the Westinghouse Electric & Mfg. Company, East Pittsburgh, has resigned to become assistant general manager of the Norma Company of America, New York City, manufacturer and importer of high-grade ball bearings, roller bearings, etc.

E. G. Rust, formerly with the Jones & Laughlin Steel Company, Pittsburgh, has resigned to become general superintendent of the Wheeling Steel & Iron Company, Wheeling, W. Va.

Fred B. Smith has been appointed assistant to President T. F. Manville, of the H. W. Johns-Manville Company, New York. For many years Mr. Smith has been secretary of the International Committee of the Young Men's Christian Association.

Charles J. Stilwell, formerly in charge of the New York office of the Warner & Swasey Company, Cleveland, Ohio, has been transferred to London to represent the company in Europe.

George G. Crawford, president Tennessee Coal, Iron & Railroad Company, on request, prepared an illustrated lecture on the manufacture of iron and steel which has been given at three of the public schools in Birmingham, Ala. This lecture has proved so interesting that the Chamber of Commerce adopted a resolution that it should be heard by the men of the city. The illustrations given were reproduced from actual photographs taken by the Tennessee Company's photographer at considerable personal danger.

Ambrose Beard has resigned as sales manager of the West Penn Steel Company, Brackenridge, Pa., and will engage in business as a dealer in high grade steel sheets, roofing tin and other products at Detroit, Mich. The name of the firm will be Ambrose Beard & Son.

I. de Biuym and F. W. Shipley have been elected directors of the M. Rumely Company, La Porte, Ind., to succeed A. J. Rumely and C. P. Holton, resigned. Mr. Holton has been elected secretary of the company to succeed Edward A. Rumely. Mr. de Biuym represents Adolph Boissevain & Co., Amsterdam, Holland.

A. P. Montague, who for the past 10 years has been general superintendent of the Lynchburg Foundry Company, Lynchburg, Va., took charge April 1 of the Covington Machine Company, Covington, Va., as its general manager. He goes with the Covington Machine Company under most favorable conditions, as it has a well developed business in punching and shearing machinery, coke drawing and loading machinery, and has just put on the market a new internal combustion fuel oil engine.

Obituary

WALTER LAIDLAW, secretary of the International Steam Pump Company, at 115 Broadway, New York, died suddenly of heart disease, March 25, at the Thirty-third street station of the Sixth Avenue Elevated Railroad. He was born in Scotland in 1849. After a severe apprenticeship as machinist he entered the engineering department of Trinity House, which has official charge of the lighthouses of Great Britain. He served as engineer and chief engineer for 10 years. He drew the specifications for and purchased the first direct-acting generator ever used for lighting, which he installed and for a while operated in the lighthouse at the Lizards, where it is still in satisfactory operation as an auxiliary. In 1891 he came to this country and located in Cincinnati, working for a while as draftsman for the Lane & Bodley Company and then as constructing engineer for Procter & Gamble. In 1900 he became vice-president and manager of the works of the Laidlaw-Dunn Company, afterward the Laidlaw-Dunn-Gordon Company. During this period he became greatly interested in the technical education and advancement of young men. It was largely through his efforts that the Ohio Mechanics Institute was placed on a solid basis. He served one term as its president. In 1910 he became general manager of the Snow Steam Pump Works, Buffalo, and in 1911 was made a member of the executive committee of the International Steam Pump Company. In 1914 he was elected secretary of the company. His wife died about a year ago.

ROBERT McCANDLESS BECK, a prominent mechanical engineer, died at his home in Hartford, Conn., March 19, from pneumonia, aged 64 years. He was born in Winchester, Va. For several years he was superintendent of the Taylor Mfg. Company, Chamberburg, Pa.; went to Hartford in 1889 and accepted a position as superintendent of the Pope Mfg. Company, then engaged in the making of bicycles; after a connection of about five years with that company went to Providence and was superintendent of the Green-Corliss Engine Works, and then he resumed his affiliations with the Pope Company. The past two years he had been a supervisor at the plant of the Underwood Typewriter Company.

B. J. SMITH, San Francisco, Cal., agent for a number of prominent machine-tool lines, and long prominent in the machinery business in that city, died March 21, aged about 65 years. He was a native of England, and had been in business in San Francisco for 27 years, having been for some years connected with Henshaw, Bulkley & Co. Under an arrangement made the first of the year, the lines represented by Mr. Smith have been taken up by Fred Ward & Son.

JOHN S. MCLEAN, who has been for 12 years in the employ of the Prentiss Tool & Supply Company, at its Boston branch, as selling representative, died at his home in Readville, Mass., March 26, from pneumonia, aged 54 years. He was a man of estimable character and was widely known in the machine-tool trade.

The Warman Steel Casting Company, Douglas Building, Los Angeles, Cal., with works at Coyote avenue, Redondo Beach, has installed a one-ton three-phase Stassano electric furnace and is now producing electric and crucible steel. The size of the buildings has been increased and additions have been made to the equipment which have about doubled the productive capacity of the company. Experiments are in process which are expected to facilitate greatly the operation of electric furnaces both as to efficiency and cost of operation.

The Duff Mfg. Company, Pittsburgh, manufacturer of the Barrett track and car jacks and the Duff screw and Duff-Bethlehem hydraulic jacks, has established a Chicago office and warehouse at 122 South Michigan avenue, in charge of Charles N. Thulin. An office has also been opened in the Pioneer Building, St. Paul, in charge of B. W. Parsons. This company's products were previously handled in the West by Fairbanks, Morse & Co.

Pittsburgh and Valleys Business Notes

A special meeting of stockholders of the Youngstown Iron & Steel Company will be held in Youngstown, Ohio, on April 29, at which it is expected that the capital of the company, which is \$1,200,000, will be increased to \$2,600,000. The funds thus secured will be used in building a steel plant with four 70-ton open-hearth furnaces and blooming and sheet-bar mills. The plant will have a capacity of 350 to 400 tons per day. At the start only three furnaces may be built, the fourth to be added later. This project was referred to in *The Iron Age* of February 19, page 526.

Work is expected to start shortly on the building of the Ohio & Pennsylvania Belt Line Railroad between Haselton, Ohio, and the State line. It will be 14 miles in length and will cost upward of \$4,000,000. It is intended eventually to make this a belt line connecting all the industrial plants in Youngstown, including Haselton and Lowellville. Most of the money for the building of the road will be furnished by capitalists of Youngstown.

On May 1 the sales office of the Niles Car & Mfg. Company, Niles, Ohio, will be removed from Cleveland to Niles. J. A. Hanna, traveling salesman for the company, will locate at Niles and in addition to being sales manager will fill the position of vice-president, succeeding T. E. Thomas, recently resigned. The company is operating its car plant at Niles to only partial capacity.

Tentative plans are under way for the consolidation of the interests of the Westinghouse Machine Company and the Westinghouse Electric & Mfg. Company. It is believed that material economies in operation could be secured by consolidating these companies into one interest. Each makes a large amount of material for the other, and the shops are located side by side at East Pittsburgh.

The Erie City Iron Company, Erie, Pa., recently incorporated, will deal in all kinds of iron and steel scrap and waste materials. It is in the market for one 25 to 30 ton shear, with 36-in. knife; one single drum belt-driven hoist, and one double drum belt-driven hoist, each of from three to four tons capacity on single cable, second hand preferred.

An error was made in the statement in this column March 12 that the Des Moines Bridge & Iron Works had changed its name to the Pittsburgh-Des Moines Steel Company. The Des Moines Bridge & Iron Works as heretofore will operate its manufacturing plant at Des Moines, Iowa, and Neville Island, Pittsburgh, the Pittsburgh-Des Moines Steel Company being the name of a new selling and construction company.

The General Electric Company, Erie, Pa., is building a new machine shop at its Erie Works, consisting of a reinforced concrete header building, 80 x 350 ft., five stories, and machine and erecting shop, 250 x 425 ft., steel construction. Specifications as to machinery and tool equipment are not available. A. W. Thompson is the engineer of building and maintenance.

The Lehigh Portland Cement Company, Mitchell, Ind., has bought the New Castle Cement Company's mill at New Castle, Pa., the consideration being \$1,200,000.

Coal operators in the Pittsburgh district and officials of the United Mine Workers held a conference in Pittsburgh this week, at which it was agreed to renew for two years the Cleveland scale now in force. This insures a continuance of mine operations in the Pittsburgh territory after April 1, and all danger of a strike of the miners is averted.

The Wishbone Auto Steel Wheel Company, Butler, Pa., has been organized with a capital of \$100,000. It proposes to make a steel wheel for automobiles to do away with rubber tires, the invention of J. W. Carnahan, Washington, D. C., who has been made president of the company. It is said that some orders have been taken.

The Standard Engineering Company, Ellwood City, Pa., has added a cast-iron roll department to its plant and is now preparing to manufacture sand and chilled rolls for all purposes.

Hall furnace of the Republic Iron & Steel Company, at Sharon, Pa., blew in March 28, after being idle for some months for relining and repairs.

THE STEEL CORPORATION SUIT

The Hearings Concluded on Monday, March 30— Arguments To Be Heard in September

On Thursday, March 26, hearings were resumed in New York City in the suit for the dissolution of the United States Steel Corporation. Counsel for the Government, in opening in rebuttal, endeavored to enter in the record the recent decision of the Interstate Commerce Commission in respect to short lines of railroads serving industries. The defense announced that if this was done it would immediately request permission to reopen its side of the case, to enter evidence defending the corporation against the charge of accepting rebates.

William G. Gray, statistician of the American Iron and Steel Institute, was again called. He offered statistical data showing the production of all kinds of iron and steel products in the United States in 1912, indicating what proportion of each has been produced by the Steel Corporation and by the independents.

George Baker, manager of sales of the Illinois Steel Company, appeared in compliance with a subpoena which requested that the Illinois Steel Company submit a list of the minimum prices which its agents have been asked to observe at different times. He stated that the records of the company are now being searched for this data and at least two months' work would be required. Mr. Colton thereupon said that the Government would not insist that this evidence be produced.

Counsel for the defense produced a pamphlet containing a large amount of data which had been prepared by the defense in compliance with a subpoena from the Government. Of this, Government counsel entered one of the tables into the record, but counsel for the defense objected, saying that the book had been prepared in response to a subpoena, and that it had been received and accepted by the Government, and that hence no part of it should be entered in the record without the whole.

On Friday, March 27, Government counsel withdrew from the record a portion of the evidence submitted Thursday, embodying the opinion recently handed down by the Interstate Commerce Commission in regard to railroads serving industrial plants. As a result of this action, the Steel Corporation attorneys announced they would not ask for permission to reopen their hearings, as they had threatened to do.

Government counsel entered an exhibit entitled "Price Changes on Tin Plate." This exhibit showed the prices specified through their sales agents by the American Tin Plate Company and the American Sheet & Tin Plate Company, between January 6, 1899, and January 1, 1914. These prices, prior to February 26, 1903, were quoted on a basis of f.o.b. New York; while on and after that date they were quoted f.o.b. Pittsburgh.

In response to a subpoena from the Government the defense produced the minutes of the Traffic Association of the United States Steel Corporation from January 11, 1909, to November 15, 1911, explaining that the minutes prior to 1909 are no longer in existence.

The Government also entered statistics showing the 1913 iron-ore production of subsidiary companies of the Steel Corporation, as well as shipments of ore from the mines during 1913.

Government counsel also entered in the record a resolution adopted by Congress December 5, 1904, which stated it was known generally that the Steel Corporation, the Lackawanna, Pennsylvania and

other steel companies were limiting production and charging prices resulting in great profits to them. The resolution said profits of \$16 a ton, or 13 per cent. of the cost, were being made on steel rails, and it commanded the Department of Justice to make an investigation into the matter. In addition to this resolution, extracts were entered from a number of New York newspapers printed at about that date.

Upon the conclusion of the Government hearings in rebuttal, the defense resumed with its testimony. John C. Neale, Pittsburgh, assistant general manager of sales of the Carnegie Steel Company, called by the defense in rebuttal, said that the company normally books orders to the number of 200 or 300 a day, and from 40 to 50 inquiries for prices are received daily. He identified a book, entered as an exhibit, as the record of prices below which the sales representatives of the Carnegie Company were not to sell steel products unless they received the special sanction of the sales manager's office in Pittsburgh.

On Monday, March 30, after a brief session, the hearings were concluded. The next step in the suit will be the filing of briefs. This will take place some time before September, when the Circuit Court of the United States will sit in Philadelphia. The Government has asked the court to fix September 15 as the date for argument to begin and to allow a week for it. The court has not yet acted on this motion. The date suggested would be almost three years after the suit was filed, which was in October, 1911.

Further Reductions of Railroad Forces

Practically all railroads east of the Mississippi river, and some of those west of it, have radically reduced shop forces or shop hours, or both. The movement has now spread to the maintenance of way forces and in a limited way to trainmen and other employees directly concerned with the movement of trains. The Pennsylvania Railroad Company has issued orders in the past week which call for very considerable reductions in working forces and train service to meet declining gross revenues and profits. It is estimated that the total number of men laid off east of Pittsburgh by these orders and others in the past few months is 25,000, and that west of Pittsburgh 13,000 men have been discharged, making a total of 38,000. At Altoona, Pa., 1250 shop men were suspended on March 26. This is the largest reduction in working forces there in years, representing about 10 per cent. of the total number employed. At Wilmington, Del., the reduction in forces in the car and locomotive repair shops and in all other departments will be about 1000. Orders issued at Philadelphia on March 26 cancel 62 passenger trains, many of them important express trains.

The Lehigh Valley Railroad Company, in a statement issued at Philadelphia, says that the reduction of its working force has been about 14 per cent. and the reduction of working hours, 33 per cent.; thus 86 per cent. of the force is working at 66 per cent. normal time. In other words, the company's operations are 56 per cent. of what could be done under full time and force. The Baltimore & Ohio for some time has been gradually decreasing its forces in view of diminishing revenues. The Lackawanna Railroad has its forces still on a winter basis, but there will be a slight increase in the maintenance department after April 1.

New York Central officials say that the reduction in working forces on that line and connected lines since December 1 is 25,000 men—15,000 east of Buffalo and 10,000 on lines west.

The Pennsylvania Steel Company has begun the erection of 28 and 32-in. mills and a new blooming mill at Steelton, Pa., and will make improvements to its 13-in. mill.

Certain Railroad Allowances Conceded

WASHINGTON, D. C., March 31, 1914.—The Interstate Commerce Commission to-day issued an order which formally approves the cancellations of allowances made to industrial lines in official classification territory by the trunk railroads, and practically all the cancellations take effect April 1. The allowances are those made by the trunk railroads to industrial lines owned or controlled directly or indirectly by the United States Steel Corporation, its subsidiaries, and other large iron and steel producers. These cancellations grow out of the opinion handed down by the commission in the so-called industrial line case. It is significant that the commission in its order of to-day approves the cancellations to all the industrial lines in the iron and steel trade without any exceptions, and now if any of the lines consider they are entitled to the allowances (as the opinion of the commission intimated that some of them were) they will have to file formal proceedings before the commission.

The industrial lines not parties to the original proceeding and whose allowances will continue are owned or controlled by such concerns as the International Harvester Company, salt companies, the Pullman Car Company and several so-called manufacturers' short lines and are about 25 in number.

W. L. C.

The Van Dorn & Dutton Company, Cleveland, Ohio, calls attention to the division of its interests which was made in May, and mentioned in *The Iron Age* at that time, but regarding which some little confusion exists, making it desirable to have the facts again set forth. The company conducted under that name is now confining its attention to gears and gear cutting. In May the owners of the company organized the Van Dorn Electric Tool Company and turned over to it production and sale of all its electrically operated portable tools. The controlling interests in the two companies are common, but each is being conducted as a separate and independent operation. The Van Dorn & Dutton Company's office at 50 Church street, New York, in charge of M. P. Fillingham, is in the interest of the gear production entirely. The Van Dorn Electric Tool Company's office at 30 Church street, New York, in charge of A. N. Frecker, is for the sale of electrically operated portable tools.

The Thurlow Steel & Forging Company, Chester, Pa., has been incorporated with a capital of \$200,000 to manufacture iron and steel castings and forgings. J. Elliot Newlin, Daniel C. Eagan and John I. Rogers, all of Philadelphia, are the incorporators. This project is the outcome of the recent purchase of the forging plant of the A. P. Witteman Company, of Chester, by interests identified with the Eagan-Rogers Steel & Iron Company, Crum Lynne, Pa., which produces converter steel castings. The company expects to spend about \$50,000 in improvements and to resume the manufacture of forgings early in April. The officers are Daniel Eagan, president; A. P. Witteman, vice-president; J. Elliot Newlin, secretary-treasurer.

The Barnes Drill Company, manufacturer of drilling machines and lathes, Rockford, Ill., has again won in the two suits brought by the W. F. & John Barnes Company, alleging unfair competition and infringement of a patent. The United States Court of Appeals has affirmed the decision of the District Court in both of these cases. The right to the use of the name Barnes has thus been securely established while the patent case was shown to be groundless.

The Detroit Steel Cooperage Company, Detroit, Mich., has been succeeded by the Pfaudler Company and will be known in the future as the Detroit Steel Cooperage Works of the Pfaudler Company. The personnel and management of the organization will remain as before.

P. McN. Bennie has severed his connection with the FitzGerald and Bennie Laboratories. The business will hereafter be carried on by the FitzGerald Laboratories, Inc., Niagara Falls, N. Y.

Canadian Pig-Iron Output in 1913

The production of pig iron in Canada in 1913, as shown by figures collected by the Bureau of Statistics of the American Iron and Steel Institute, amounted to 1,015,118 gross tons, against 912,878 tons in 1912. Of the 1913 total 986,848 tons was made with coke and 28,270 tons with charcoal, coke and electricity. The number of furnaces in blast in Canada at the close of 1913 was 10, of which 6 were in Ontario and 4 in Nova Scotia. Seventeen furnaces were active at some time in 1913.

The production of basic pig iron in 1913 was 558,524 tons against 489,799 tons in 1912; of Bessemer pig iron, 227,662 tons against 228,742 tons; of foundry pig iron and ferrosilicon, 225,231 tons against 194,208 tons; and of malleable Bessemer and white and mottled pig iron, direct castings, ferrotitanium, etc., 3701 tons last year against 129 tons in 1912. The 1,000,000-ton mark in pig-iron output was crossed for the first time last year.

Two new blast furnaces were under construction at the close of 1913. Of the 22 completed furnaces 17 usually use coke for fuel and 5 use charcoal. Two new coke furnaces were added in 1913: one 20 x 85 ft., blown in May 22, belonging to the Dominion Iron & Steel Company, and the other at Port Colborne, Ontario, 19½ x 85 ft., belonging to the Canadian Furnace Company, Buffalo. The Standard Iron Company, Ltd., of Montreal, completed a charcoal furnace at Parry Sound last year. It is 12 x 60 ft. and was first blown in on August 22.

Pig-Iron Production by Grades in 1913

The Bureau of Statistics of the American Iron and Steel Institute has published statistics showing the production of pig iron by grades in 1913. The figures are given in a table below, together with those for the three years preceding, in gross tons:

	1913	1912	1911	1910
Bessemer and low-phos.	11,593,385	11,664,015	9,409,303	11,245,642
Basic	12,537,746	11,417,886	8,520,020	9,084,608
Foundry and ferro-silicon	5,219,918	5,973,873	4,468,940	5,260,447
Malleable Bessemer	993,736	825,643	612,533	845,123
Forge pig iron	324,832	469,183	408,841	564,157
Spiegeleisen	110,338	96,346	110,236	153,055
Ferromanganese	119,496	125,378	74,482	71,376
White and mottled, direct castings, ferro-tit., etc.	66,850	54,612	45,192	81,159
Total	30,966,301	29,726,937	23,649,547	27,303,567

The consumption of iron ore by blast furnaces in 1913 was 58,274,000 gross tons, against 55,656,000 tons in 1912; while the consumption of mill cinder, scale, etc., last year was 3,009,000 tons, against 4,319,000 tons.

The consumption of limestone for fluxing purposes was 16,072,858 tons in 1913, against 15,092,166 tons in 1912 and 12,086,956 tons in 1911. The average consumption of limestone per ton of pig iron made in 1913 was 1162.6 lb.; in 1912 it was 1137.2 lb.

The National Stoker Company has been incorporated under the laws of Delaware, with main office at Covington, Va. It will have branches at 88 Wall street, New York, and in the Columbia Building, 416 Fifth street, N. W., Washington, D. C. The capital stock is \$300,000, of which \$150,000 is preferred and \$150,000 common stock. John S. Ham, Covington, Va., is president; Frank Lyman, 88 Wall street, New York, is secretary-treasurer; M. S. Noffsinger, Covington, Va., is assistant secretary-treasurer. The company is formed for the purpose of handling Crowe smokeless stokers in the United States. The Covington Machine Company, Covington, Va., will manufacture the stokers and the National Stoker Company will devote all its energies to selling them. No machinery will be required.

The Foster Bolt & Nut Mfg. Company, Cleveland, Ohio, has placed contracts for the immediate erection of an extensive two-story brick addition to its manufacturing department and a new office building. It is also installing a complete automatic sprinkler system to cover the entire plant.

American Can Co.'s Tin-Plate Contract

Government suits against large corporations lay bare to the public many details of their business which are usually hedged with much secrecy. One of the developments in the suit for the dissolution of the American Can Company was the production at the hearing in New York City on Thursday, March 25, of a contract signed April 29, 1913, whereby the American Sheet & Tin Plate Company is to supply the Can Company with a minimum amount of 250,000 tons of sheet and tin mill products yearly for a period of six years at a discount from the prevailing market price. The contract reads as follows:

Contract made this 29th day of April, 1913, between American Sheet & Tin Plate Company (hereinafter called seller) and American Can Company (hereinafter called buyer), both corporations of New Jersey. Said parties, each in consideration of one dollar (\$1) and of the agreements of the other herein stated, hereby agree as follows:

Buyer agrees that it will buy a minimum amount of 250,000 tons of sheet and tin mill products for use in its own plant (whether black or coated) from seller, each year during the period of six (6) years from Jan. 1, 1913.

Seller agrees to allow buyer on all sheet and tin mill products purchased by it for domestic use, the following schedule of discounts, from the net domestic selling schedule of seller then in force:

On cokes, charcoals and ternes—When the net domestic current selling price of American Sheet & Tin Plate Company of standard 100-lb. prime coke tin plates is:

Selling price	Discounts per base box
\$3.85 or higher per base box.....	22 1/2c.
3.80 per base box.....	21 1/2c.
3.75 per base box.....	20 1/2c.
3.70 per base box.....	19 1/2c.
3.65 per base box.....	18 1/2c.
3.60 per base box.....	18 1/2c.
3.55 per base box.....	17 1/2c.
3.50 per base box.....	16 1/2c.
3.45 per base box.....	16 1/2c.
3.40 per base box.....	15 1/2c.
3.35 per base box.....	15c.
3.30 per base box.....	14 1/2c.
3.25 per base box.....	13 1/2c.
3.20 per base box.....	13 1/2c.
3.15 per base box.....	12 1/2c.
3.10 per base box.....	11 1/2c.
3.05 per base box.....	11 1/2c.
3.00 per base box.....	10 1/2c.
2.95 or lower per base box.....	10c.
On black plate, black and galvanized sheets, per 100 lbs.....	15c.
On galvanized wasters, per net ton.....	\$1.00

Contracts, or orders under this contract, shall call for ruling current prices at the time such tonnage is placed.

In the event of a decline in seller's selling schedule, buyer is to receive the benefit of such revision on any unspecified portion of a contract or unshipped portion of an order, and in the event of the re-establishment of prices, after a decline, the unspecified portion of a contract and the unshipped portion of an order, shall command prices equal to the increase, but in no case shall prices be higher than those called for at the time of entry of any such contract or order.

The ruling cash discount shall be allowed on the net amount of invoices after the deduction of the special discount allowed by this contract.

This contract shall inure to and be binding upon the successor or successors of the parties respectively, and included within the provisions hereof, and going to make up the minimum hereby provided, shall be all purchases by buyer itself, or any of its branches, or owned companies, or its or their successor or successors.

Witness our hands and seals this 29th day of April, 1913.

American Sheet & Tin Plate Company.

E. W. Pargny, President.

(Seal)

Witness: H. B. Wheeler, Secretary.

American Can Company.

F. S. Wheeler, President.

(Seal)

Attest: R. H. Ismon, Secretary.

Original contracts of a similar nature entered into by the American Can Company and the American Sheet & Tin Plate Company, December 1, 1908, and April 11, 1905, also were entered in the record.

Collective Bargaining in the Foundry Trade

The relations of the International Molders' Union with foundrymen will be considered at the session of the United States Commission on Industrial Relations at Washington, Monday afternoon, April 6. The Washington hearings, which will deal with collective bargaining, conciliation and arbitration, begin at the Shoreham Hotel on the morning of April 6, and will continue for four days. Frank P. Walsh, chairman of the commission, will preside and all the nine commissioners will be present. Each of six industries in which trade agreements or other forms of collective bargaining have been in operation, will be considered. These include coal mining, molding, the clothing industry, printing trades, building trades and railroads. At the Monday afternoon session the witnesses will be Joseph F. Valentine, of Cincinnati, president of the International Molders' Union, and John F. Frey, editor of the International Molders' Journal, for the employees; Thomas J. Hogan, Chicago, secretary of the Stove Founders' National Defense Association, and O. P. Briggs, formerly president of the National Founders' Association, for the employers.

At the final hearing on Thursday, April 9, Samuel Gompers, J. A. Emery, C. P. Neill, Louis Brandeis, and others, will appear.

Action of the Machine Tool Builders

As indicated elsewhere, the result of the letter ballot of the National Machine Tool Builders' Association was the decision to hold its semi-annual convention at Worcester Thursday and Friday, April 23 and 24, immediately following the National Metal Trades' Association convention. The Hotel Bancroft will be the meeting place. Several papers will be read, but most of the time will be given up to meetings of the various sections representing the branches of the machine tool industry. The complete programme has not yet been arranged.

The American Emery Wheel Works, Providence, R. I., is distributing a chart giving the causes of grinding wheel accidents. It was prepared by the Independent Inspection Bureau, Philadelphia, and is one of the most complete analyses of grinding wheel accidents that has been compiled. It takes up such accidents as broken wheels, flying wheels, the hurling of work or dresser out of the operator's hand, the entrance of flying particles of emery into the lungs or eyes and the flying of broken pieces of the revolving type of dresser. The various principal causes of these accidents are given, followed by numerous subdivisions.

The Sixth International Congress of Mining, Metallurgy, Engineering and Economic Geology will meet in London, England, July 12 to 17, 1915. Among the topics for discussion and presentation of papers may be mentioned: Iron-ore briquetting, electric smelting of iron ore, processes of steel manufacture, wear of steel, etc.

Imports of finished and semi-finished iron and steel into India in 1913 were valued at £9,871,850, as compared with £7,151,499 in 1912 and £6,579,482 in 1911. The values of imports of machinery of all kinds for the same periods were £5,306,774 in 1913, £3,512,927 in 1912 and £3,033,632 in 1911.

The Case Alumni Club, of New York, entertained about 60 members of the senior class of the Case School of Applied Science, Cleveland, Ohio, at a banquet at the Marlborough-Blenheim, New York, Monday evening, March 30.

The total deliveries of all kinds of steel and iron of the Russian Prodmet for 1913 amounted to 2,120,222,896 net tons, as compared with 2,034,194,287 in 1912.

Armor plate manufactured by the Carnegie Steel Company is to be used in Swedish battleships. A shipment was recently made from Philadelphia.

The Machinery Markets

While New England has become more dull than ever, other important machine tool manufacturing and distributing centers show a slight improvement, either in sales or inquiries, despite the dormant state of railroad buying. In no district, however, is business really brisk. In New York some good orders have been placed, but they were not widely distributed and the general tenor is one of quiet hopefulness. Improvement is shown in Cleveland, there being some requirements in sight which make April look encouraging. Machine tool dealers in Cincinnati give fairly good reports, though automobile makers are not buying to a satisfactory extent. Sales are quiet in Detroit, but inquiry is stronger for miscellaneous tools; the foundry trade has felt an improvement and the demand for electrical equipment is fairly active. Chicago items indicate many plant enlargements. Purchases are light, but somewhat improved in Milwaukee, where electrical machinery is in good demand also. The demand in the Central South is not good. Both sales and inquiries are desultory in St. Louis and activity seems waiting on action by railroad buyers. The railroads, mines and sawmills have not entered the market to any appreciable extent in Birmingham, but there nevertheless is a slightly better demand. Favorable weather is aiding conditions in Texas. Mills in the Pacific Northwest are giving machinery dealers a fair amount of business and the outlook is for a good season.

New York

NEW YORK, April 1, 1914.

The greater part of the trade continues to find both sales and live inquiries unsatisfactory in point of number, but some dealers had their average for March brought up in a pleasing way by a few good orders. Only a few sellers shared the business. The Morrow Mfg. Company, Elmira, N. Y., is one of the companies which has done some very attractive purchasing. As a rule new inquiries are not up to normal for this season but between the new ones coming in and those which have been standing for some time, the outcome of April is looked forward to hopefully. It is said that the requirements of the Grand Trunk Pacific Railway, for its new shops at Prince Rupert, B. C., which were made known in November last by William T. Donnelly, consulting engineer, 17 Battery Place, New York, will be placed within ten days. J. H. Guess, Montreal, is the purchasing agent of the road. The total expenditure for machine tools, boiler shop and foundry equipment will approximate \$150,000. The trade is hopeful that the Seaboard Air Line will place orders in the near future against the big list it has had out for some time, but in the matter of railroad business the trade is getting used to disappointments. Local dealers have received a long list of hand tools and accessories required by the Havana Electric Railway, Light & Power Company, Havana, Cuba, the list embracing such articles as clamps, twist drills, reamers, dies, pliers, Stillson pipe wrenches, monkey wrenches, screw drivers, steel tapes, screw drivers, ball and peen hammers, oilers, etc. The list fills four typewritten pages.

The Ampere Control Mfg. Company, Buffalo, has been incorporated by E. W. Jones, R. E. Heard and L. C. Kinnius to manufacture control systems for automobiles, motor boats, aeroplanes, etc. The capitalization of the company is \$100,000.

The National Base Ball Company, Schenectady, N. Y., will build a factory on Altamont avenue 60 x 120 ft., one story and basement, structural steel and cement construction.

The Wollensak Optical Company, Rochester, N. Y., has been incorporated with a capital stock of \$300,000 to manufacture optical and photographic goods. A. and J. C. Wollensak and H. C. Gorton, Rochester, are the incorporators.

The Niagara, Lockport & Ontario Power Company is completing plans for a power plant to be erected on the Salmon River near Pulaski, N. Y.

The Pratt & Letchworth Company, Buffalo, will erect a two-story building, brick and steel, at its factory, Tonawanda street and the New York Central Railroad.

The Winter Brothers Company, Buffalo, will erect a two-story and basement bottling works 60 x 100 ft. at North and Ellicott streets.

The Reuther Mfg. Company, Hamburg, N. Y., manufacturer of agricultural implements, is having plans prepared for a factory building 100 x 100 ft., one story. John W. Conde is secretary.

The Craig Colony for Epileptics, Snyea, N. Y., Percy L. Lang, president of the board of managers, will receive bids until April 14 for construction and equipment for a cold storage plant, furnishing and installing boilers, steam apparatus, engines, generators, etc., for a power plant.

The R. L. Tuck Company, North Tonawanda, N. Y., manufacturer of wagons, has commenced construction of a factory on Thompson street.

The Utica-Willowvale Bleaching Company, Chadwick, N. Y., has taken a long lease of the Munson Brothers foundry, Utica, N. Y., and will equip it for operation at once.

J. B. Dugan's Sons, Inc., Troy, N. Y., have filed incorporation papers to manufacture trunks, etc. The capital stock is \$125,000. A. L. F. and J. Dugan, Troy, are the incorporators.

The board of electric light commissioners, Jamestown, N. Y., will receive bids until April 16 for one 1000-kw. turbine generator, etc.

The Puritan Food Products Company, Chicago, is preparing plans for an addition to its factory at Fredonia, N. Y., three stories, 115 x 132 ft., brick, structural steel and reinforced concrete. Paul Delaney is manager.

The Seabury Mfg. Company, Jamestown, N. Y., manufacturer of tabourets, medical cabinets, etc., will build a three-story addition.

The Hudson Condensed Milk Company, Hermon, N. Y., has been incorporated with a capital stock of \$250,000 to manufacture condensed milk, etc.

A two-story addition is to be built to the newspaper plant of the Dunkirk Observer, Dunkirk, N. Y. H. K. Williams is president.

The Motor Radiator Corporation, Buffalo, capitalized at \$50,000, has been incorporated by C. W. Dipper and others to manufacture radiators, etc., for automobiles and motor boats.

The plant of Plail Brothers Chair Company, Wayland, N. Y., was completely destroyed by fire March 27 with a loss of \$35,000. The factory will be rebuilt.

The George F. Grivel Company, Buffalo, has been incorporated to manufacture and deal in foundry supplies. George F. Grivel, William Dodge and L. M. Dentinger are the directors.

The Turner Construction Company, 11 Broadway, New York City, has been awarded the general contract for the construction of a reinforced concrete terminal warehouse for John E. Bradley, opposite the Union Station, Worcester, Mass., 100 x 212 ft., eight stories and basement. In addition to the warehouse there will be a power house and a concrete railroad trestle. W. S. Timmis, Broadway and Thirty-fourth street, New York City, is the architect.

C. F. Smith, borough clerk, Allendale, N. J., will receive bids until April 9 for constructing a water works.

Catalogues Wanted

Catalogues from manufacturers of power punch presses are wanted by the Union Chain & Mfg. Company, Seville, Ohio.

Philadelphia

PHILADELPHIA, PA., March 30, 1914.

The A. Mecky Company, 1705 Allegheny avenue, Philadelphia, manufacturer of children's vehicles, is building a factory, 98 x 110 ft., five stories, brick construction. Stearns & Castor, Stephen Girard Building, are the architects.

C. C. Kempton & Son, 320 Race street, Philadelphia, are building a factory, 76 x 97 ft., six stories, reinforced concrete construction, at an estimated cost of \$100,000. The William Steele & Sons Company is the engineer.

John & James Dobson, Inc., Falls of Schuylkill, Philadelphia, manufacturer of carpet and plush, will build additional factory buildings at an estimated cost of \$250,000, and will remodel its power plants.

Fire did \$25,000 damage at the foundry and pattern shop of Joseph Duncan & Son, Lykens, Pa., on March 25. Patterns over 65 years old were destroyed and a number of valuable sets for mining engines and material were ruined.

About \$2000 damage was done March 26 to the foundry of E. N. Cooper, Harrisburg, Pa., the fire having started in the casting department.

The Danville Foundry & Machine Company, Danville, Pa., is in the market for a crimping machine for round wire, $\frac{1}{4}$, 1, $1\frac{1}{2}$ and 2-in. mesh. Irvin Vannan is general manager.

The Sanitary Ice Company, Trenton, N. J., is in the market for a 50-ton Arctic ice-making machine and an Otto gas engine.

The Trenton Porcelain Company, Trenton, N. J., manufacturer of electrical porcelain supplies, is building an addition to its factory, 25 x 70 ft., two stories, concrete construction.

New England

BOSTON, MASS., March 31, 1914.

Business has slumped off. No one attempts to tell the reason why, but some hope is expressed that the real spring months, April and May—the usual buying period—will develop a change for the better. In fact, the next few weeks will be watched with unusual interest. In a few instances business has improved, but not among those dependent on the metal industry. Word comes from Whitinsville, Mass., that the foundry of the Whitins Machine Works, manufacturer of textile machinery, has gone on full time. These works employ 2500 hands when on a normal basis and 3000 when running full.

The Meade-Morrison Mfg. Company, Boston, Mass., builder of conveying machinery for coal, coke and other materials, is occupying its new shops in East Boston, on the branch of the Boston & Albany Railroad which serves the piers at which the steamships from Europe and other countries dock. The works are modern in every detail, with large machine shop and plate shop. The company will add to the plant this spring a pattern shop 80 x 150 ft. The machine shop and plate shop are designed for longitudinal extension, the site being large enough to permit the duplication of the buildings in this direction, and the erection of a duplicate group parallel to the present structures and their extensions, the proposed foundry serving both.

The Washburn Shops of the Worcester Polytechnic Institute, Worcester, Mass., has issued a license under its English patents for a power feed mechanism as applied to a drilling machine—the invention of Prof. W. W. Bird, head of the mechanical engineering department, and Louis W. Rawson, superintendent of the shops—to Alfred Herbert, Ltd., Coventry, England.

The Beaton & Cadwell Mfg. Company, New Britain, Conn., is moving to New Britain the business of the McGee Supply Company, Brooklyn, N. Y., manufacturer of automatic valves of various types. The Beaton & Cadwell Company plans to increase its factory by a four-story addition to be erected on land recently acquired adjacent to its property.

The Ansonia Brass & Copper Company, Ansonia, Conn., is receiving estimates for the addition, already mentioned, which will be 60 x 440 ft.

A company headed by Harry T. Kanderer, recently with the Lancaster Mills, Clinton, Mass., is planning to establish a factory in Clinton for the manufacture of labor saving household appliances.

The Automatic Polishing Machine Company, Inc., has been incorporated under the laws of Connecticut, to make machinery, commencing business with \$10,000 cash capital. The incorporators are Simon Kumkumian and Wilbur H. Gaines, Meriden, and Nicholas J. Downey, Wallingford, Conn.

Cheney Bros., South Manchester, Conn., silk manufacturers, will add to their works a weaving shed 150 x 321 ft., two stories; a yarn dyeing house 80 x 326 ft., two stories, and a boiler house.

The Neptune Hardware Company, Norwalk, Conn., is about to award the contract for its new factory, foundations for which were put in last fall. The building will be 60 x 200 ft., one and two stories.

The property and business of the Pratt & Cady Company, Hartford, Conn., manufacturer of steam and water fittings and hydrants, have been taken over by a New York corporation of the same name, and the receiver has been dismissed by order of the Superior Court of Connecticut. The understanding is that the business will be continued.

Henderson & Ervin, Norwalk, Conn., are planning the immediate building of a factory. The Handel Company, Meriden, Conn., will erect a factory 40 x 88 ft., four stories.

Chicago

CHICAGO, March 30, 1914.

Announcement is made that ground will be broken for the first group of buildings for the Pullman Free School of Manual Training at Pullman, Ill., within the next two months. C. Frank Johnson, 79 East Adams street, is the architect preparing the plans. Courses of instruction already determined upon include carpentry, pattern making, blacksmithing, machine-shop practice, power-plant operation and electrical installation. In other directions prospective business in machinery lines offers few features of interest.

The Grimm Boiler Company, Quincy, Ill., a partnership, has been succeeded by the Illinois Mfg. & Supply Company. New equipment is to be installed. Oscar E. Grimm is president.

At Elgin, Ill., the contracts for the machinery to be installed in the municipal lighting plant at a cost of \$162,000 will be awarded April 14.

The Bates Machine Company, Joliet, Ill., is making plans for the enlargement of its plant and will undertake the manufacture of an oil tractor.

The F. Meyer & Bro. Company, Peoria, Ill., furnace manufacturer, is opening a branch office at Kansas City to be followed by the erection of a manufacturing plant.

William Schulze, architect, 2009 West North avenue, Chicago, has prepared plans for a one-story factory to be erected near Western avenue, on Homer street. The building will be 64 x 83 ft., and will cost \$6000.

The city of Chicago has completed its plans and will proceed to the construction of a two and one-half-story brick foundry, 87 x 192 ft., to be erected at 3124 South Sacramento avenue, at a cost of \$185,000.

The Grawoig Ice Company, 1526 South Jefferson street, Chicago, will build a one-story brick ice plant, 75 x 125 ft., on South Hamilton avenue, the cost to be \$15,000.

The city of Chicago is about to build a four-story brick boiler house, 57 x 148 ft., at the pumping station at the foot of Montrose boulevard, the cost of which is estimated at \$75,000.

The Griffin Wheel Company, Chicago, has placed the contracts and is beginning the erection of a foundry at Los Angeles, Cal. The completed plant is expected to represent an aggregate cost of \$350,000 and will embrace a car wheel shop, brass foundry, machine shop, pattern shop and pattern storage.

A cold storage plant involving about \$40,000 for

building and equipment will be established at Oklahoma City, Okla., by Swift & Co., Chicago, Ill.

The Altorfer Bros. Company, Roanoke, Ill., in addition to building a factory to replace the one recently destroyed by fire, will erect a large factory for the manufacture of washing machines at East Peoria, in the near future. The Peoria factory will be equipped with electric motor drive throughout, and it is planned to install a blower system of heating. The company desires to receive catalogues and price lists of iron and wood-working machinery to replace those lost in the recent fire.

The American Sand Blast Machine Company, 14 East Jackson Boulevard, Chicago, a partnership, has been succeeded by a company incorporated with a capital of \$25,000 under the name American Sand Blast & Machine Company. The company will continue its assembling plant in this city for its standard lines of sand blasting equipment as well as special machinery.

The Chicago Gas & Electric Company has been acquired by the Shiras Electric Company, 921 Locust street, St. Louis, where a new plant will be erected, 100 x 175 ft., two stories.

The Continental Railway Supply & Equipment Company, Chicago, has been incorporated with a capital of \$300,000 and will manufacture and market railroad equipment. The incorporators are Oglesby Allen, Jr., Joseph P. Williams and Thomas P. McDonough.

The Gardiner Storage Battery Company, Chicago, has been incorporated with a capital of \$12,000 to manufacture electrical equipment. It was organized in the office of Joseph L. Toohey, 10 South La Salle street.

The Kruse Forgings Company, Chicago, organized to conduct a general machinist and blacksmithing business, specializing in hammer and die forgings, has been incorporated with a capital of \$15,000 by T. F. Tansey, A. A. Winter and George W. Nilsson, 800 Laurel street, Austin station.

The Willis Mfg. Company, Galesburg, Ill., has let contracts for additions to its plant which will increase the floor space by about 2000 sq. ft. to be devoted to the manufacture of metal window sash.

The city of Galesburg, Ill., has voted \$75,000 of bonds for additions to the water supply system.

Alexander Osling and Richard Rinaldo, Waukegan, Ill., have arranged to build a garage and machine shop at North Chicago. Construction of the building has already been started.

The Frantz Mfg. Company, Sterling, Ill., will build a factory, 100 x 100 ft., three stories, semi-mill construction, at an estimated cost of \$45,000. G. W. Ashby is the architect.

The Duluth Mfg. Company, Duluth, Minn., has been incorporated by W. L. Jackson and others, to manufacture and sell a patented bolt and pipe threading machine. It will build a factory in Duluth in the near future.

The Nutting Truck Company, Faribault, Minn., whose plant was damaged by fire recently, is rebuilding on a larger scale.

Milwaukee

MILWAUKEE, WIS., March 30, 1914.

Slight improvement is noted in the machinery trade, particularly in tools, although purchases are still light and of no individual consequence. Tool builders report a better demand and an increased volume of inquiries, both local and foreign, and are maintaining their positions well. Electrical equipment is in good demand, due to industrial development and municipal work. Some good structural work is in sight in Milwaukee. From now on it is confidently expected that conditions will improve. Decided conservatism is discerned throughout the district, but there is enough necessary buying in sight to sustain hopes.

The Barton Gravel Company, Milwaukee, will install a gravel washing, screening and reducing plant of 1000 yd. daily capacity, at Barton, Wis., to cost \$35,000. Plans are in charge of Edwin J. Haddock.

The J. Massino Mfg. Company, 651 Third street, Milwaukee, manufacturer of gas and electric fixtures and metal art novelties, will build a \$22,000 factory at 740-742 Third street. George C. Ehlers is the architect.

The Plymouth Foundry & Machine Company, Plymouth, Wis., has awarded contracts for the construction of a two-story brick and steel addition, 60 x 136 ft., to be devoted to the manufacture of ensilage cutters.

The George W. Jagers Mfg. Company, Racine, Wis., has leased the former Racine Hosiery Company factory, at Fifteenth and Clark streets, Racine, and is equipping for the production of light gasoline motors in large quantities for the Argo Motor Company, New York. The first year's requirement of motors is 10,000 engines, with 20,000 called for in the second year. Operations will begin about May 1.

The South Side Foundry Company, Port Washington, Wis., manufacturer of light and heavy gray iron castings, has completed a new molding room, 40 x 70 ft., giving it a total molding room floor space of 70 x 160 ft.

Peter Paulson will build a new garage and machine shop at Neillsville, Wis., to cost \$10,000.

The Wisconsin Public Service Company, Appleton, Wis., proposes to build car and motor repair shops, etc.

T. H. Field, Rice Lake, Wis., automobile dealer, will equip a building for garage and repair shop purposes.

William Koehler, Athens, Wis., has purchased a site at Marshfield, Wis., and will build a fireproof garage and machine shop, 40 x 100 ft.

The Two Rivers Plating Works, Two Rivers, Wis., will build a large addition and install equipment.

The Price Mfg. Company, Fond du Lac, Wis., capital \$100,000, has been incorporated by John R. Price, W. F. George and William Kallberg.

The Kahlenberg-Klaus Company, Two Rivers, Wis., capital \$25,000, has been organized by Louis Kahlenberg to engage in the manufacture of internal combustion engines, etc. A shop will be erected.

Articles of incorporation have been filed by the Olson Concrete Mixer Company, capital \$20,000, with headquarters at Elkhorn, Wis. Those interested are E. H. Eames, John J. Haugen and L. M. Swan.

The Augustine Rotary Valve Motor Company, Marshfield, Wis., is preparing to engage in the manufacture of internal combustion engines. Considerable equipment will be required.

The Wisconsin Dental Burr Company, West Bend, Wis., has filed notice of an increase in its capital stock from \$30,000 to \$50,000. The new issue will be devoted to the purchase of equipment, etc.

The Federal Optical Company, Milwaukee, has been organized by T. O. F. Randolph, K. Randolph and M. Mollerus to establish a shop for the production of lenses, supplies for opticians, etc. New grinding and lathe equipment will be required.

The W. H. Pipkorn Company, 712 Park street, Milwaukee, foundry supplies and building material, has increased its capital stock from \$100,000 to \$125,000. William H. Pipkorn is president.

The Arneson Foundry Company, Kenosha, Wis., has awarded contracts for the construction and equipment of an addition to its iron foundry, to be 50 x 90 ft. The S. Obermayer Company, Chicago, will furnish the equipment for producing steel castings by the converter process.

Cleveland

CLEVELAND, OHIO, March 30, 1914.

The machinery market appears to show further improvement and the outlook is more promising than it was at the beginning of March. The volume of inquiry is much better than for some time. While inquiries during the week were mostly for single tools, a list came out from an Ohio maker of automobile parts for about a dozen machines and another from a steel plant for six or eight machines, including two lathes, a shaper and drill press. The Alliance Structural Company has an inquiry out for about a dozen punches and shears for a new fabricating plant to be established in Alliance, Ohio. In electrical machinery there is a fair demand for the equipment for lighting and electric railroad company and for small motors, but not much demand for equipment for industrial power plants.

The Cuyahoga Bed Spring Company, Cleveland, recently incorporated, has leased a building at 800 Canal road, N. W., and will begin the manufacture of bed springs. A. Poslonson, Pittsburgh, is president, and B. Berman, Erie, Pa., is secretary.

The Cleveland Auto Radiator Company, Cleveland, has been formed with a capital stock of \$20,000 by J. S. Dickle, and others, to manufacture automobile parts.

The Peters Machine & Mfg. Company, Whitney Power Block, Cleveland, maker of transmissions, front and rear axles and steering gears for automobiles, will shortly begin the erection of a factory at 7320 Madison avenue. It will be a one-story structure of brick and steel, 80 x 209 ft.

The Federal Brass Mfg. Company, Cleveland, has been incorporated with a capital stock of \$25,000 by R. H. Hunger, M. A. Niepert, W. H. Nye, and others, to manufacture brass goods.

The city of Cleveland, Ohio, will spend \$1,300,000 for a new filter plant.

The Perfection Spring Company, Cleveland, has an inquiry out for fourteen machines, including one drilling machine and two disk grinders, the remainder being special spring making machines, all motor driven.

The Cleveland Car Roofing Company, 5414 Lakeside avenue, Cleveland, is building a factory 140 x 300 ft., one story, steel and concrete. W. S. Ferguson Company, 1900 Euclid avenue, is the architect.

The Reliance Gauge Column Company, 5902 Carnegie avenue, Cleveland, is building a factory, 46 x 130 ft., four stories and basement, steel and concrete construction.

The Midgely Tire & Rubber Company, of which Harry Davis, Pittsburgh, Pa., is president, has practically decided to locate in Lancaster, Ohio, where it is stated negotiations will be closed for acquiring the Flint Glass plant, which is to be used as a site.

O. D. Everhard, director of public service, Barberton, Ohio, will receive bids April 4 for two 15-hp. motors, two duplex deep well pumps, electrically driven, and other equipment for the municipal water works plant.

The Quaker Oats Company, Akron, is planning the erection of a new boiler house.

Detroit

DETROIT, MICH., March 30, 1914.

Quiet conditions continue in the local machinery market as far as actual sales are concerned. Inquiry is slightly stronger both for standard and miscellaneous tools. Rumors are current of a prospective list of tools for the Hudson Motor Car Company, but definite information is not available. The automobile industry is buying few tools and what purchases are being made are largely for replacement purposes. The second-hand machinery market is dull. There is a strong demand for small motors and electrical equipment generally is fairly active. Some improvement is reported in the foundry trade. Building circles are active and several projects involving a large amount of structural steel work are being figured on.

The Murphy Power Company, Detroit, operating a general power business, has under consideration the erection of a large power plant. It will be built on a larger scale than the present one and will be equipped to provide for the company's rapidly increasing business.

The Wagner Baking Company, Detroit, is having plans prepared for a four-story building to be used largely for manufacturing purposes. The building will be of irregular shape, approximately 270 x 370 ft.

Dodge Bros., Detroit, manufacturers of automobiles and accessories, have awarded contracts for the construction of a four-story reinforced concrete factory building to be used mainly as a woodworking shop.

The Cricket Cyclecar Company, Detroit, has been incorporated with \$500,000 capital stock by William L. Davis, George F. Burton, Victor F. Dewey, and others. It proposes to engage in the manufacture of cyclecars.

The Detroit Battery Company, Detroit, has been incorporated to manufacture storage batteries and parts thereof. The new company has established a factory

on Greenwood avenue. M. G. Pierson is president and general manager.

The Detroit Trust Company has been appointed trustee of the Herreshoff Motor Company, Detroit, which has been adjudicated a bankrupt.

The F. L. Jacobs Company, Detroit, operating a welding plant, has increased its capital stock from \$15,000 to \$65,000.

The Michigan Limestone & Chemical Company, Rogers City, Mich., is planning extensive improvements to its plant and properties, including the installation of additional power machinery.

The Gratiot County Gas Company, Alma, Mich., has been incorporated to operate a gas plant. The plant will be erected at Alma and will be of sufficient capacity to supply several neighboring towns. C. F. Brown is president and general manager.

The capital stock of the Bond Steel Post Company, Adrian, Mich., manufacturer of metal fence posts, has been increased from \$100,000 to \$125,000, to provide for additional manufacturing facilities. Larger quarters will be secured.

The Adrian Steel Castings Company, Adrian, Mich., has increased its capital stock from \$30,000 to \$40,000.

The Chubb Mfg. Company, Howell, Mich., has been incorporated with \$5000 capital stock to manufacture small tools and specialties.

The Parsons Mfg. Company, Detroit, has been incorporated with \$15,000 capital stock to manufacture general hardware. Carl B. Parsons, Charles T. Knisely and John McN. Burns are the incorporators.

Cincinnati

CINCINNATI, OHIO, March 30, 1914.

Despite the somewhat restrained tone of general business, quite a number of local machine tool builders are making fairly satisfactory reports. Several have received considerable export business, while the scattered support from the domestic trade continues encouraging. However, the automobile manufacturers are not making any purchases and the railroads are slow in buying except for urgent requirements. As far as is known, no buying has been done on the Seaboard Air Line Railroad's list, issued some time ago. Milling machines and medium sized lathes appear to be in better demand than other classes of machine tools. Both the dealers and second-hand machinery firms report a slight let-up in the inquiry, although they already have considerable business under negotiation. Conditions with the foundries are unchanged and none is operating to full capacity.

It is expected that work on the proposed foundry addition to the plant of the Lunkenheimer Company, Cincinnati, will be begun early in the spring. No equipment details have been given out.

The Holland Glass Company, Carthage-Cincinnati, announces that it will not dismantle its plant at Urbana, Ohio, as previously noted. In this event considerable machinery will be required for the proposed bottling factory to be built in Carthage suburb.

The John Bangers & Sons Company, Cincinnati, will make an addition to its tannery plant that will be 25 x 50 ft., two stories, and of mill construction. Very little equipment will be required.

The United States Can Company, Norwood, Ohio, a Cincinnati suburb, has tentative plans under way for increasing the size of its factory. No equipment details will be known until building plans are completed.

Secretary Jenisch, of the Industrial Club, Covington, Ky., announces that the R. T. Pearce Cotton Goods Mfg. Company will soon fit out a plant at Pike and Scott streets. Some special machinery will be required, including a few small electric motors.

The Bradley Electric Garage Company, Dayton, Ohio, has been incorporated with \$10,000 capital stock, and will probably add a small repair shop later. Francis Bradley is one of the principal incorporators.

The Midgely Tire & Rubber Company, Lancaster, Ohio, has made definite arrangements to open a plant at that point, and has purchased the old plant of the

Flint Glass Company. Considerable special equipment will be needed.

E. L. Shuey, Dayton, Ohio, is asking bids on the construction of a large power building to be erected at Springfield, Ohio. Considerable electrical and power plant equipment will be required. The Industrial Bureau of Springfield is interested in the project.

In addition to the proposed car barns to be erected by the Springfield Railway Company, Springfield, Ohio, mentioned some time ago, a boiler room and an addition to the company's repair shops are contemplated.

The Burkett Mfg. Company, Columbus, Ohio, has increased its capital stock to \$75,000 and will increase its manufacturing facilities. The company makes special agricultural implements. Practically all the necessary machinery has been purchased.

The Oglesby Stove & Furnace Company, Frankfort, Ind., whose incorporation was recently noted, will probably soon be in the market for foundry equipment.

The Harlan Coal Mining Company, Barbourville, Ky., will soon be in the market for power plant and electric generating equipment. The company expects to establish a central power plant for its different mines.

It is currently reported, but not officially confirmed, that the Baltimore & Ohio Railroad Company will soon commence the reconstruction of its repair shops at Zanesville, Ohio, closed several years ago.

The Lummus Cotton Gin Company, Columbus, Ga., is inquiring in this market for an electric spot-welding outfit and an 18-in. engine lathe.

The J. F. Witmer Company, Buffalo, N. Y., has been commissioned to draw up plans for a waterworks and filtration plant to be erected by the city of Ironton, Ohio. Mention of this proposed plant was made some time ago.

Indianapolis

INDIANAPOLIS, IND., March 30, 1914.

The Standard Concrete Machine Company, Indianapolis, has been incorporated with \$25,000 capital stock, to manufacture concrete machinery. The directors are H. F. Schoen, C. B. Henkle and C. H. Halt.

The Wabash Foundry Company, Wabash, Ind., succeeds the Wabash Foundry & Machine Company, taking over all the buildings, equipment, good will, etc.

The Reichert Mfg. Company, LaPorte, Ind., has been incorporated to manufacture wire novelties. The directors are F. S. Crockett, A. W. Reichert and J. H. Reichert.

The Walker Starter Company, LaPorte, Ind., has increased its capital stock \$20,000.

The Chambers Mfg. Company, Shelbyville, Ind., has increased its capital stock from \$50,000 to \$125,000.

The Power Transmission Clutch Company, Rushville, Ind., has filed notice of dissolution.

The Wayne Machinery Company, Ft. Wayne, Ind., has been incorporated with \$25,000 capital stock, to manufacture machinery. The incorporators are George H. VanArman, N. Rothschild and W. E. Friedell.

The Connersville Fireproof Safe Company, Connersville, Ind., has been incorporated with \$30,000 capital stock, to manufacture safes. The directors are E. W. Ansted, F. I. Barrows and O. M. Hempleman.

The Wilson & Sons Piano Company, Muncie, Ind., has been incorporated with \$30,000 capital stock, to manufacture pianos. The directors are D. W. Wilson, R. N. Wilson and J. A. Riddle.

The Hoosier Tie Plug Company, Spencer, Ind., has been incorporated with \$24,000 capital stock to manufacture wooden products. The directors are W. G. Moss, T. T. Bixler and S. M. Royer.

The Fields Company, Terre Haute, Ind., has been incorporated with \$4000 capital stock to manufacture canning machinery. The directors are George R. Fields, S. Rose and George O. Dix.

The Carson & Shaw Mfg. Company, Alexandria, Ind., has been incorporated with \$25,000 capital stock to manufacture wool fibre and mineral wool from rock. The directors are J. W. Carson, Charles V. Shaw and T. B. Shaw.

Birmingham

BIRMINGHAM, ALA., March 30, 1914.

A slightly increased demand for machine tools and some change for the better in the general machinery market is reported. The needs of structural operators establish the only really bright spot in the market. The country trade in agricultural implements is apparently normal. Railroads, mines and sawmills, the backbone of the local machinery trade, have not re-entered the market in any extensive way.

E. L. Russell and associates are organizing a company at Gadsden, Ala., for the purpose of establishing a brick plant. The capital stock is \$15,000.

R. G. Hoover, J. J. Lamar and D. A. McPhail of Lakewood, Fla., are organizing a company at Florala, Ala., for the establishment of a ginnery. The capital stock is to be \$10,000.

The Georgia Barrel & Lumber Company, Pineora, Ga., has been chartered with a capital stock of \$10,000 for the purpose of establishing a factory for the manufacture of barrels, operating a planing mill, etc.

The Adel Gin Company, Adel, Ga., will add ten gins to its plant.

The Britton Lumber Company will rebuild its lumber mill at Lakewood, Fla., recently destroyed with a loss of \$25,000.

The H. H. Miller Furniture Company, Brunswick, Ga., will erect a factory.

The River Tie Company, capital stock \$25,000, has been chartered at Mobile, Ala., by R. T. Gallagher and D. C. Gleason, of Meridian, Miss., and others. They will manufacture oak ties.

The Canal Export Company, Birmingham, Ala., has been chartered by R. H. Elliott, of Birmingham, E. P. Kimbrough, of Greensboro, Ala., W. C. Lovejoy and others, of Montgomery, Ala. The authorized capital stock is \$300,000 and operations are to start with \$165,000 paid in. It is understood that the company will engage extensively in the coal mining business with special reference to the export trade.

The H. M. Miller Furniture Company, Brunswick, Ga., will establish a factory for the manufacture of furniture and furniture novelties. Walter Miller is general manager.

H. J. Lyon, Madison, Ind., will organize the Lyons Stove Company, Carrollton, Ga., and build a factory to cost \$20,000.

The Pensacola Lumber & Timber Company, Pensacola, Fla., has been chartered by Wilmer Haywood, J. D. Haywood and others with a capital stock of \$25,000. A lumber mill is to be established.

The Central South

LOUISVILLE, KY., March 30, 1914.

The machinery market is still marked by a rather poor demand. It is apparently a between-seasons condition, as industrial activity has not opened up appreciably. Not many inquiries have been received, although some projects are reported which will probably develop in a few months. Electrical equipment is moving slowly. No large orders were received by manufacturers last week. Refrigerating machinery demand has come to a standstill, although fabricating plants are shipping out back orders. Mining and oil development is expected to become active.

The Red Chief Mfg. Company, 704 East Main street, Louisville, will add equipment for the manufacture of corn-mills, having recently increased its capitalization from \$7600 to \$10,000.

The C. C. Mengel & Brother Company, Louisville, will purchase a machine for shredding hardwood boards.

The Swiss Cleaners & Dyers, Louisville, will install a machine shop in the factory it is building. H. E. Mechling is manager.

Equipment for manufacturing explosives is to be purchased by the Union Safety Powder Company, Louisville. C. W. Shaffer, Starks Building, Louisville, is president.

E. J. Howard, owner of a large shipyard at Jeffersonville, Ind., across the river from Louisville, will

purchase in about three or four months additional equipment to increase its capacity for manufacturing steel-hull boats.

The Parker Buggy Company, Henderson, Ky., will require wood-working, metal-working, leather-cutting and power equipment. John Delker, Henderson, Ky., is the owner.

J. U. Kevil, Mayfield, Ky., owner of the Star Mills, Clinton, will purchase flour milling machinery, elevating equipment and power equipment to be used in replacing the plant which burned recently with loss of \$40,000.

A new shoe factory is to be established at Louisa, Ky. The Commercial Club, Louisa, has information concerning its requirements.

A new boiler and some new sawmill equipment will be required by W. T. Smith, Bowling Green, Ky. Considerable damage to machinery was done by the explosion of a boiler recently.

New equipment to be installed in the College of Civil Engineering at Kentucky University, Lexington, includes an impact machine, standard abrasion cylinder, ball grinding mill with motor, standard hardness testing machine, diamond core drill, circular diamond saw and standard grinding saw. Most of this has been ordered by Dean Rowe.

W. M. Hutchens has purchased the flour mill of R. H. Blakey, at Elizabethtown, Ky., and will enlarge it by the purchase of new equipment.

George W. Tompkins, Owensboro, Ky., will reopen the Lees machine shop and will add new equipment.

A small dynamo, boilers, transmission equipment, etc., will be bought by the J. E. Powell Electric Company, Lewisburg, Ky., recently organized by J. E. Powell and others.

New refrigerating machinery will be bought shortly by the Pikeville Ice Company, Pikeville, Ky., which has increased its capital stock from \$4000 to \$15,000.

An electric light plant is to be installed at Whitesburg, Ky., by a company being organized by Stephen Combs, and others.

The General Electric Company is negotiating with W. H. Netherland, of the proposed Central City, Drakesboro & Greenville Railroad, for the installation of a large central station on Green River, near Central City, Ky.

New equipment costing several thousand dollars will be purchased by the American Nicotine Company, Henderson, Ky.

The Selby Shoe Company, Ashland, Ky., is having equipment in its new shoe factory installed by M. R. Morris. More machinery will be added.

A plant for the manufacture of transmission for automobiles will be equipped at Glasgow, Ky., by Otto Summers, and others, who have incorporated under the name of the Summers Brothers Company.

The Memphis Steam Laundry Company, Memphis, Tenn., will purchase new equipment. It has increased its capital stock from \$150,000 to \$300,000.

Refrigerating and power equipment will be purchased by James Smallwood, Central City, Ky.

Robert Stimson, who has recently taken charge of the C. L. Willey Veneer & Lumber Company, at Memphis, Tenn., will purchase equipment for the plant, which is to be a rotary veneer mill.

The Morton Broom Works, Morristown, Tenn., will purchase new motors and broom manufacturing equipment. The capacity of the plant is to be increased from 75 to 150 dozen brooms a day.

The Southern Railway will construct machine shops at Coster, Tenn., for the manufacture of steel cars. B. Herman, Washington, D. C., is chief engineer. The same railroad will require transformers for its block system in the neighborhood of Knoxville, Tenn. A substation is to be built at Morristown, Tenn. F. S. Wynn, Washington, D. C., is the general purchasing agent.

Both power and leather-cutting machinery will probably be purchased for the harness factory to be established at the army quartermaster's depot, Jeffersonville, Ind. Address the War Department, Washington.

Alex Walker and G. C. Rose, owners of the Lancaster, Ky., electric light plant, are considering improving it at a cost of \$7000 to \$10,000.

The Ellis Coal & Ice Company, Hopkinsville, Ky., will build a large cold storage plant.

The Chicago Veneer Company, Burnside, Ky., will build a rotary mill at Clarendon, Ark., for which power, transmission and special equipment will be required. B. W. Lord is president.

The Kentucky Electrical Company, Owensboro, Ky., will probably enlarge its plant to increase its facilities for the manufacture of drawn-wire tungsten lamps. Its daily capacity at present is 1000 lamps. R. W. Littell is manager.

The Consolidation Coal Company, Jenkins, Ky., will triple the capacity of its coal-mining plant.

The Edmonton Light & Power Company, Edmonton, Ky., recently incorporated, will purchase a generator for the power plant of a local flour mill.

Texas

AUSTIN, TEXAS, March 28, 1914.

Favorable weather conditions have aided in improving the machinery situation in Texas. Cotton planting is in full swing. Increased acreages have created a brisk demand for gin machinery, which is the feature of the trade at the present time. A large hydroelectric power project near San Antonio is creating interest.

The Smiley Gin & Milling Company, Smiley, will enlarge its equipment and purchase boilers and machinery to double the capacity of the gin.

The Boettcher Company, Weimar, has taken over the Weimar ice and cold storage plant and will make extensive improvements and enlarge it. J. O. Boettcher is president.

The Mexia Pressed Brick Company, Mexia, is building a plant.

The Tyler Traction Company, Tyler, is building repair shops, etc.

The Rosenberg Ice & Light Company, Rosenberg, will install a 150-hp. oil engine. Pumping machinery will be needed.

The Farmers' Gin Company, Hallsburg, organized with a capital stock of \$4000, will erect a cotton gin. The incorporators are H. Campbell, T. D. Cooper and Pearl Busby.

The Independent Gin Company, Sinton, organized with a capital stock of \$10,000, will erect a cotton gin. The incorporators are C. McDaniel, R. E. Morse and R. L. Myers.

The Runge Gin Company, Runge, organized with a capital stock of \$6000, will build a cotton gin. Incorporators are W. Weatherford, Tom Dromgoble and Frank Newsom.

The Guadalupe Water Power Company, San Antonio, has completed plans for the construction of a hydroelectric project on the Guadalupe River, which will develop 100,000 hp. The company is a Texas corporation with a capital stock of \$400,000. E. W. Brown, Orange, is president; W. B. Dunlap, Beaumont, vice-president, and G. M. Abbott, secretary.

The Van Alstyne Gin Company, Van Alstyne, has been formed with a capital stock of \$15,000 and will erect a large cotton gin. The incorporators are R. M. Cannon, J. B. Moore and L. P. Walker.

The Tucson, Phoenix & Tidewater Railroad, Phoenix, Ariz., recently incorporated, will build shops at Phoenix, and will probably establish general shops and offices at El Paso. Coach and car works may also be erected when the line is completed. W. C. Foster, Phoenix, and others, are the incorporators.

The Tucson Gas, Electric & Power Company, Tucson, Ariz., will expend about \$200,000 in improvements, including an enlargement of the lighting plant. Considerable machinery will be purchased.

Roy Campbell, San Antonio, is planning to build a cold storage plant at San Benito.

La Feria Land Syndicate, Des Moines, Ia., will double the pumping capacity of its canal system on the Rio Grande near La Feria. F. G. Collins is man-

ager, and R. H. Johnson, La Feria, is engineer in charge.

The Cactus Alcohol Company, El Paso, has been organized and is erecting a plant for the manufacture of alcohol from cacti. Various fiber articles will be made from the residue. Frank T. Thatcher is president and general manager.

Newburger, Henderson & Loeb, Philadelphia, Pa., have purchased a controlling interest in the Corpus Christi Street & Interurban Company. It is said that the new owners plan to make a number of improvements.

St. Louis

ST. LOUIS, Mo., March 30, 1914.

Inquiry for machine tools is of the most desultory sort and the aggregate of business is reported very low. Inquiries have been much scattered the past week and have run to small business. Second-hand tools are also inactive. Both new enterprises and extensions are being kept at the minimum and the impression is general that the one quieting influence more than any other is the withdrawal from the market of the railroads.

The Crescent Motor Car Company, St. Louis, recently incorporated with a capital stock of \$50,000 by George A. Root, and others, will equip for the building of automobiles.

The Ingalls Stone Company, St. Louis, has been incorporated with a capital stock of \$50,000 by Charles C. Ingalls, Bedford, Ind., and others, of St. Louis, to develop quarries at Ste. Genevieve, Mo.

The Miller Store Equipment Company, St. Louis, has been incorporated with a capital stock of \$15,000 by Milton and L. W. Miller, and others, to manufacture wood equipment for window display, etc.

The Loughman Cabinet Company, St. Louis, has bought additional ground and will erect an addition to its factory.

The Schurk Iron Works Company, St. Louis, has begun the construction of a plant for the fabrication of iron material for buildings. Considerable equipment will be required.

The Measuregraph Company, St. Louis, has been incorporated with a capital stock of \$300,000 by W. E. and G. Carlton Hosch, A. O. Simpson, Wyatt Shallcross, and others, and will equip to manufacture and deal in a patent fabric measuring and cutting machine.

The water commissioner of the city of St. Louis will install coal feeding and dumping apparatus at the Chain of Rocks Station involving an expenditure of about \$60,000. Similar equipment will be installed at two other city water plants.

The St. Louis Frog & Switch Company, St. Louis, has increased its capital from \$200,000 to \$300,000 for the purpose of business extension and factory enlargement.

The Hudson-Brace Motor Company, Kansas City, Mo., has been incorporated with a capital stock of \$20,000 by W. J. Brace and others to equip a garage and repair shop.

The Galt Light & Power Company, Galt, Mo., recently incorporated with a capital stock of \$10,000 by A. D. Miller and others, is reported in the market for equipment.

W. F. Heins, Carrollton, Mo., is reported in the market for a small amount of equipment for an automobile repair shop.

The Kaw Valley Sand Company, 419 Rialto Building, Kansas City, Mo., has been incorporated with a capital stock of \$100,000, by J. E. Morton, and others. It is in the market for 10-in. centrifugal pump and other machinery. D. R. Ingram is manager.

The Metal Specialty Company, Kansas City, Mo., has been incorporated with a capital stock of \$30,000 by A. H. McKinley, A. J. Davies and John F. Kendig, and will equip a manufacturing plant.

H. S. Swanson, it is stated, will equip a plow manufacturing plant at Tulsa, Okla. He is connected with the Swanson & St. Joseph Plow Company, St. Joseph, Mo.

The Western Tablet Company, St. Joseph, Mo., has increased its capital stock from \$100,000 to \$200,000 for the purpose of increasing its factory equipment.

F. A. Griffith, Rich Hill, Mo., is reported in the market for machinery for a brick and tile plant.

The Gasconade Sand & Gravel Company, Arlington, Mo., recently incorporated by R. E. Lee, Springfield, Mo., and others, is reported in the market for double hoist engine, gravel buckets, boilers and other equipment for a gravel plant.

The Saxon Kansas City Motor Company, Kansas City, Mo., has been incorporated with a capital stock of \$12,000 by L. T. Shelton, and others, and will equip a garage and repair shop.

It is stated that land has been bought near East St. Louis, Ill., by the Hadley Mfg. Company, Indianapolis, for a factory for the manufacture of patented agricultural implements. A. N. Hadley is president; Morris E. Cox, secretary, and Frank Hite, treasurer. About \$2,500,000 is reported involved.

The Batesville Marble & Granite Company, Batesville, Ark., will install about \$5000 worth of marble-working machinery.

The Western Wheelbarrow Mfg. Company, Fort Smith, Ark., has been incorporated with a capital stock of \$150,000 by C. E. Speer, and others.

The Quinton Ice, Light & Power Company, Quinton, Okla., is in the market for ice-making machinery and equipment for a telephone exchange and a power plant. Milo T. Crane, McAlester, Okla., is in charge.

An ice manufacturing plant will be equipped at Spencer, Okla., by M. J. Kringlen.

The city of Morris, Okla., will expend about \$42,000, on a water works plant. The Benham Engineering Co., Oklahoma City, is the engineer.

The sawmill recently burned at Pineville, Miss., with a loss of \$25,000 on equipment, will be replaced. F. V. B. Price is the owner.

The Aponaug Mfg. Company, Kosciusko, Miss., has been incorporated with a capital stock of \$125,000 by J. W. Sanders, and others.

The North Louisiana Electric Company, Shreveport, La., has completed its financing and is reported ready to begin construction of power houses, tracks, etc., for about 100 miles of line.

The Baton Rouge Electric Company, Baton Rouge, La., is planning to add considerable equipment.

The Mississippi Electric Company, Columbus, Miss., has been incorporated with a capital stock of \$1,000,000 by Charles F. Sherrod, F. W. Crosby, Battle Bell, J. W. Lipscomb, G. Y. Banks, and others, and will build power plants, etc.

The Crescent Advertising Novelties Company, New Orleans, La., has been incorporated with a capital stock of \$25,000 by J. P. Simmons, and others, and will equip a factory.

The Thomas Cusack Company, Chicago, Ill., has obtained a site and will equip a factory in New Orleans, La., for the manufacture of electrical and other ornamental and metal signs.

The Automobile Trading Company, New Orleans, La., has been incorporated with a capital stock of \$50,000 by D. O. Myatt, and others, and will equip a repair and renewing plant.

The Lyon Cypress Lumber Company, Garyville, La., which purchased about 105,000 acres of timber land, is reported planning immediate equipment of plants for its development.

The Pacific Northwest

SEATTLE, WASH., March 24, 1914.

No large inquiries have appeared in the local machine tool market, but the movement in single tools and small groups runs to a fair aggregate, and is gradually increasing. Woodworking machinery is in good demand, though few projects calling for complete mill outfits are coming out at present. Most of the north Pacific ports are making large expenditures for harbor improvements, in connection with which there is a

good demand for contractors' equipment; and it is expected that similar business will soon result from railroad and irrigation work in the interior.

The mammoth locks in the government canal between Lakes Union and Washington are more than three-quarters completed. The first shipment of steel will be delivered and ready for use in less than three weeks. This project entails the expenditure of \$5,000,000, and its successful completion will mean much for Seattle.

The Pacific Sea Products Company, Seattle, recently incorporated, has purchased the properties of the Alaska Whaling Company. The station at Akutan, Alaska, will be doubled in size at a cost of \$300,000, including the installation of new machinery.

The Weyerhaeuser Timber Company, Tacoma, will begin the construction of a large saw mill in Everett about June 1. The proposed plant will have a daily capacity of 250,000 ft., according to George S. Long, the general manager.

Charles F. Heddon, of the Maxwell Motor Car Company, Detroit, announces that it plans to build an assembling plant in Seattle.

Los Angeles capitalists, represented by E. B. Waterman, Los Angeles, recently secured an option on 4500 acres of land near Olympia, Wash., where they propose building a manufacturing city. C. D. Hillman, Seattle, is interested.

The Davis Car Company, Seattle, recently filed articles of incorporation with a capitalization of \$200,000. It will build a factory for the manufacture of automobiles. L. W. Davis is interested.

The Morris Automatic Basket Company, Spokane, Wash., recently filed articles of incorporation. It is capitalized at \$50,000 to manufacture patent baskets. B. H. Fuller, A. E. Knight, and others, of Spokane, are the incorporators.

It is announced that the Oregon-Washington Railroad & Navigation Company will this year build a 10-stall round house and shops at Walla Walla, Wash.

The Kirkland Reinforced Concrete Fence Post Company, Seattle, has been incorporated by Howard G. Cosgrove, A. H. Findley, and others. It is stated that it will erect a factory.

It is reported that the Irondale Steel Mill, Port Townsend, Wash., will be equipped to manufacture corrugated sheets, and will soon be started up.

The Inland Empire Paper Company, Spokane, has increased its capitalization from \$250,000 to \$500,000. The additional capital will be used in improvements and extensions to its mill.

The Kilkenny Automatic Safety Appliance Company, Walla Walla, Wash., manufacturer of a steam boiler safety device, plans to start a shop.

The McCormack-Daily Lumber Company, Seattle, has been incorporated by James D. McCormack, Vancouver, B. C., and Roy A. Daily, Seattle, with a capital stock of \$500,000.

James Lindsay, Portland, Ore., will construct a hydroelectric power plant on Mill Creek, Douglas County, Ore. The installation will include three 1150-hp. horizontal, Francis type turbines, acting under a head of 263 ft., direct connected to three 750-kw. three-phase alternating-current generators.

The Northwest Lead & Machinery Company, Portland, Ore., has placed contract for all the equipment for its new shops. Operations will be started in about 60 days. John T. Lund is president.

The Columbia Okanogan Orchards Company, Wenatchee, Wash., are making plans for the installation of a pumping plant.

The Adams-Coleman Lumber Company, Leavenworth, Wash., has been organized, with capital stock of \$25,000. J. B. Adams, Leavenworth, is president. It will complete the sawmill started by the Kellogg Lumber Company in Entiat Valley, and erect a large box factory.

The North Yakima Milling Company, North Yakima, Wash., is having plans completed for the rebuilding of its mill recently burned with a loss of \$100,000.

The Keno Power Company, Keno, Ore., has filed articles of incorporation, with a capital stock of \$250,000. It will enlarge its plant at Keno. New machinery will be installed.

The Grandin Coast Lumber Company, Seattle, Wash., capital stock \$1,750,000, has filed articles of incorporation. O. W. Fisher and O. D. Fisher, of Seattle; John B. White, Kansas City, Mo.; G. W. Grandin, Cleveland, and others, are the incorporators. It is stated that its plans include the erection of a \$1,000,000 mill near Seattle. W. W. Warren, Fisher, La., will be manager and engineer.

The Eugene Iron Works, Eugene, Ore., has arranged to manufacture a line of camp stoves, and is considering an addition to its plant.

The Keno Power Company, Klamath Falls, Ore., recently incorporated, proposes to increase its hydroelectric plant to 900 hp.

J. H. Williams and A. W. Moon have completed plans for a sawmill to be installed near Grants Pass, Ore.

The Portland school department has just received figures on a pipe cutting and threading machine.

The Canadian Flax Mills Company, Toronto, advises that it will build a plant in Portland.

The city of Pullman, Wash., has issued \$20,000 of bonds for improvements and additions to the water system. Plans include a pumphouse, 100 hp. electric motor and pump, etc.

Eastern Canada

TORONTO, ONT., March 28, 1914.

The Sand Mixing Machine Company of Canada, Ltd., Brantford, Ont., has been incorporated with a capital stock of \$50,000 by Nathaniel D. Neill, Murdoch Macpherson, John G. McKay, and others, to manufacture machinery, etc.

W. C. McCall, city clerk, Simcoe, Ont., will receive bids until April 15 for constructing a sewer system at an estimated cost of \$50,000.

It is announced that work will shortly be started on the construction of the power plant of the Laurentide Company at Grand Mere, Que.

The Ford Motor Company will erect a factory at London, Ont., for the manufacture of automobiles, etc.

Westinghouse, Church, Kerr & Co., New York, have been retained by the Canadian Pacific as engineers to investigate the proposed electrification of the new double track 5½-mile Selkirk tunnel in British Columbia. The investigations will cover in general the type of system to be installed, the relative economies of steam and water power and the effect of electrification upon operating conditions.

Fire did damage to the extent of \$60,000 to the machinery and stock of the R. D. Fairbairn Company, Pearl and Simcoe streets, Toronto.

Williams Shoe, Ltd., Brampton, Ont., has been incorporated with a capital stock of \$200,000 by John McMurchy, Charles M. Collum, and others, to manufacture boots, shoes, etc.

The Perfect Machinery Company has been organized with J. Rumble, of Blenheim, Ont., president; Wesley Clark, of Guelph, Ont., vice-president, and S. L. Clark, of Galt, secretary-treasurer. It will erect a plant at Galt, Ont.

The Lion Silverware Company, Ltd., capitalized at \$40,000, will erect a factory at Galt, Ont. A. Richardson, Toronto, is interested.

The Globe Furniture Company will build a large addition to its factory on Erb street, Waterloo, Ont., to cost about \$125,000.

The ratepayers of Leaside, Ont., passed a by-law to grant \$40,000 for sewers and \$42,000 for a waterworks system.

The Dominion Stove Company, Kingsville, Ont., is having plans prepared for a stove foundry 100 x 142 ft., one and two stories.

Contracts have been awarded for the erection of a

factory building 80 x 120 ft., one story, at Woodstock, Ont., for the Wayne Oil Tank & Pump Company. A. W. Grosvenor, Ft. Wayne, Ind., is the architect.

Plans are in progress for the erection of a factory for the International Register Company at Ft. Erie, Ont., for the manufacture of registers, small safes, etc.

The Johnston Motor Company, Ft. Erie, Ont., recently organized with a capital stock of \$1,000,000, has completed plans for a steel and brick factory which will cost, with machinery, approximately \$200,000. D. J. Johnston, Toronto, is manager.

Western Canada

WINNIPEG, MAN., March 28, 1914.

The Carberry Milling Company, Ltd., Carberry, Man., has been incorporated with a capital stock of \$50,000 by Thomas E. McGregor, John Graham, William D. Card and others to manufacture flour, etc.

The Moosehorn Lime Company, Ltd., Winnipeg, Man., has been incorporated with a capital stock of \$200,000 by Frank K. Hamilton, William Martin, John Galloway and others to manufacture lime, cement, etc.

It is announced that the Eureka Fireless Stove Company, New York and Los Angeles, Cal., will erect a factory at Vancouver, B. C.

The Skeena River Fisheries, Hays Port, B. C., is planning to make additions to its factory, including a cold storage plant. The total expenditure will be about \$50,000.

The Wellman Gravel & Supply Company, Ltd., will install washing, loading and rock crushing plants at Ponoka, Alta.

The Great Northern Tannery, Edmonton, Alta., will double the capacity of its plant.

It is announced that a large linseed oil factory will be erected at Regina, Sask., by Chicago capitalists. A company will be organized under the name of the United Oil Company of Western Canada, and will have a capital stock of \$200,000. Duncan B. Lea, Chicago, is representing the company.

A new sawmill is to be erected at Porto Rico, B. C., by C. W. Mankin, and associates, who will engage in the business of supplying poles, piling, posts, etc.

Government Purchases

WASHINGTON, D. C., March 30, 1914.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until April 14, schedule 6587, for 13 spur-gear chain hoists for Philadelphia; until April 21, schedule 6577, for 12 1½-ton trolley hoists for Newport; schedule 6578, for one 1-ton traveling crane for Portsmouth; schedule 6585, for 12 spur-gear chain hoists for Norfolk; until April 28, schedule 6570, for motor generator testing sets for Boston, Portsmouth, New York, Mare Island and Puget Sound; until May 5, schedule 6562, for one automatic turning machine for Mare Island.

Bids will be received by the Paymaster General, Navy Department, Washington, until April 7, for the following material: Schedule 6534, class 94, for 32,000 ft. of black wire hoisting rope and 8000 ft. of guy wire rope for Brooklyn; schedule 6537, class 115, for three single-phase transformers for Norfolk.

Bids will be received at the Bureau of Yards & Docks, Navy Department, Washington, until April 4, for two 200 kw. three-machine motor generator sets for Philadelphia.

Bids will be received by the United States Reclamation Service, 605 Federal Building, Los Angeles, Cal., until April 8, for furnishing one centrifugal pumping unit.

Bids will be received by the Supervising Architect, Treasury Department, Washington, until April 20, for one hydraulic freight lift pumping plant, etc., for Montgomery.

Bids will be received until April 18 by the General Purchasing Officer of the Isthmian Canal Commission, Washington, schedule 837, class 5, for three induction

motors; class 8, for 33,000 ft. plow steel hoisting cable and 13,000 ft. plow steel cable.

Bids will be received by Major J. P. Jervey, U. S. Engineers' Office, Wheeling, W. Va., until April 20, for furnishing and erecting a power house and the following equipment: One 115-hp. boiler, one steam-driven air compressor, two air receivers, one feed-water heater, one feed-water pump, one service pump, etc., at dam No. 12, Ohio River, for furnishing and erecting steel lock gates for dam No. 19, Ohio River. Bids will be received by Lieut. Col. Joseph E. Kuhn, U. S. Army, Engineers' Depot, Washington, until April 20, for furnishing three 2-ton hand-operated traveling cranes, and one transfer bar with trolley complete.

Bids were received at the Bureau of Supplies and Accounts, Navy Department, Washington, March 24, for furnishing material and supplies for the navy yards as follows:

Schedule 6432, Steam Engineering

Class 11, Brooklyn—bid A—Four turbo generating sets on basis of duty paid, if any—Bid 28, \$47,200, \$42,200, \$56,700, and \$51,700; 37, \$48,000; 44, \$44,821; 68, \$50,940; 85, \$46,964.

Bid B—Do, duty free—No bids.

Schedule 6435, Steam Engineering

Class 73, Philadelphia—1 water-tube oil-burning testing boiler, with tools and spares—Bid 8, \$4900; 12, \$5678.50.

Schedule 6439, Construction and Repair

Class 42, Brooklyn, bid A—Duty paid, 11 centrifugal pumps—Bid 1, \$21,814.25; 9, units; 14, \$20,331.45; 19, units; 21, \$24,018.25; 27, \$18,546.23; 28, \$28,456.40; 48, \$16,273; 63, \$17,750; 66, units; 84, \$3421.91, part.

Bid B—Do, duty free—No bids.

Schedule 6486, Ordnance

Class 81, Pneumatic cylinders and spare parts as follows: 2 at Camden, 2 at Quincy, and 1 at Washington—Bid 22, \$3120.

Bids were received by the General Purchasing Officer of the Isthmian Canal Commission, Washington, on March 19, under canal circular 834-A.

Class 16, one machine punch—Bid 13, \$60.88, 29 days.

On March 20, under canal circular 832.

Class 3, for 5000 ft. extra flexible plow-steel cable, ¾-in.; 150,000 ft. ¾-in. 8 strands; 10,000 ft. ¾-in. and 12,000 ft. ½-in., 6 strands—Bid 25, \$3192.30, 30 days; 34, \$2923, 60 days; 49, \$2452.60, 30 days; 51, \$2799, 21 days; 55, \$2622.50, 40 days; 57, \$3507, shipment 10 days.

Class 4, for 3000 ft. straight-link chain—Bid 5, \$1287.50, 60 days; 11, \$1455, 30 days; 25, \$1137, 35 days; 43, \$1110, 30 days.

The names of the bidders and the numbers under which they are designated in the above lists are as follows:

1. Alberger Pump & Condenser Company
2. Babcock & Wilcox Company
3. F. A. Branda & Co.
4. Columbus Chain Company
5. James Beggs & Co.
6. Blackall & Baldwin
7. A. S. Cameron Steam Pump Works
8. Camden Iron Works
9. Curtis Pneumatic Machinery Company
10. J. B. Kendall Company
11. Diehl Mfg. Company
12. DeLaval Steam Turbine Company
13. George C. Moon Company
14. General Electric Company
15. Standard Chain Company
16. Kerr Turbine Company
17. Lawrence Machine Company
18. U. S. Steel Products Company
19. Waterbury Company
20. Wire Products Importing Company
21. Broderick & Bascom Rope Company
22. National Electrical Supply Company
23. Providence Engineering Works
24. Ridgeway Dynamo & Engine Company
25. Wittermann Company
26. Westinghouse Electric & Mfg. Company

Bids were received by the Reclamation Service, under advertisement 277, opened March 17, for transformers, etc., for the Sun River project as follows:

Pittsburgh Transformer Company, Pittsburgh, \$483, 3900 lb., Pittsburgh, 30 days.

Westinghouse Electric & Mfg. Company, Los Angeles, Cal., \$510, 2900 lb., East Pittsburgh, 30 days; \$138.57, Newark, N. J.; \$130.50, Pittsburgh, 30 days.

B. F. Kierulff, Jr., & Co., Los Angeles, \$545, 3300 lb., Fort Wayne, 30 days; \$150.80, Fort Wayne, 30 days.

Wagner Electric & Mfg. Company, St. Louis, \$552, 2115 lb., East St. Louis, 45 days.

General Electric & Mfg. Company, Los Angeles, \$553, 2365 lb., Pittsfield, Mass., 60 days; \$150.80, Lynn, Mass., 20 days.

Allis-Chalmers Mfg. Company, Los Angeles, \$630, 2000 lb., East Norwood, 40 working days.

HORIZONTAL DRILLING MACHINE

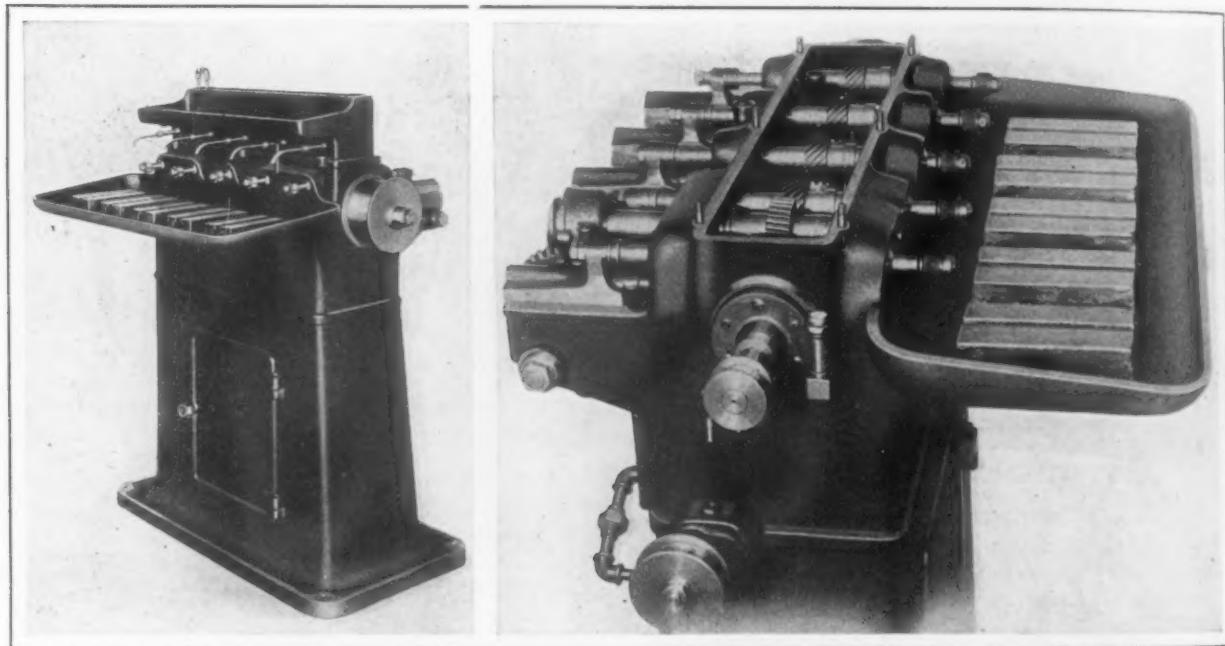
New Semi-Automatic Tool for Rapid Drilling of Small Holes in Small Work

A new line of semi-automatic horizontal drilling machines designed for drilling small holes in small work that requires precision, speed and quick handling has been brought out by the Detroit Tool Company, Detroit, Mich. The machine is built in two sizes, the No. 1, which is illustrated, being for very small high speed work. Among advantages claimed for the horizontal type of drilling machine are that the work can be handled with very simple fixtures in which the piece can be located without moving the fixture or interference by the drill, the work and the drill are constantly in sight and the chips are carried away with the drilling solution.

The machines are strong and compact, being designed to save floor space. The drill feed is automatic. The main shaft extends through the machine bed at right angles to the spindle and is driven by a three-step cone pulley unless otherwise specified, the illustration showing the machine equipped with a single pulley. The spindles are driven di-

feed. Each spindle is carried in two bearings of ample size. The spindle bearings, the main driving shaft bearings and the bearings of the two shafts controlling the camshaft are of high grade bearing bronze. The spindles are of alloy steel accurately ground and carefully balanced.

The spiral gears are inclosed in an oil reservoir, which also furnishes lubrication to the spindle and main shaft bearings. This reservoir is partly filled with oil and the gears carry the oil up thoroughly lubricating themselves and filling the oil channels leading to the bearings. The construction of the machine with all working parts inclosed provides a smooth, positive, noiseless driving system, and the exclusion of dirt and chips prevents the throwing of oil and furnishes a lubricating system that requires little attention. The drilling lubricant is supplied from a tank and is carried by curved pipes directly to the work. A uniform flow at a constant pressure is assured as a surplus of oil is pumped into the tank and a steady level is maintained by an overflow. A large volume of oil is supplied to the drill at low pressure, which washes away chips without splashing. The oil is drained from the chip pan through a strainer to a settling basin in the



One of a New Line of Semi-Automatic Horizontal Drilling Machines for Small Hole Work and the Spindle Driving Gear Arrangement

rectly from the main shaft through spiral gears. Spiral and worm gears are used throughout, and are located in a compartment of the bed back of the pan. Between the first and second and the fourth and fifth spindles and parallel to them are shafts, one driven by spiral gears direct from the main shaft and the other connected to the camshaft through a worm gear. These two shafts are connected at the rear of the machine by a belt running over three-step cone pulleys, thus providing three different spindle feeds for each speed. The spindle feed is obtained by cams on the camshaft operating against a roller attached to a slide on the rear of the spindles. The slide is forced forward by the action of the cam and brought back by the spring. The end thrust of the spindles is taken by a ball thrust bearing at the rear end.

The machine is also illustrated with the upper part and work pan removed to show the gear arrangement. The machine illustrated, however, was built for a fixed feed and so has only one camshaft

base from whence it goes to a reservoir in a base and is pumped back to the tank. Each machine is equipped with a positive feed pump.

As the drill feed is automatic the operator has only to look after placing the work in the fixtures. With the positive cam feed any desired rate of feed may be provided and the feed may be automatically increased after the drill has entered the work or decreased, or the drill may be backed up to clear deep holes without attention from the operator. After the proper feed is worked out it is constant. Drill feeds being independent of the operator he must maintain a steady production at the determined speed or fall behind the machine.

In designing a compact machine the spindles are placed as close together as possible without crowding. The work pan, which is provided directly above the spindles, obviates the necessity of tables and pans alongside of the machine and also locates the work conveniently for the operator. The No. 1 machine shown is designed for drills up to $\frac{1}{8}$ in., and

for holes not exceeding $\frac{3}{4}$ in. deep. It has $\frac{3}{4}$ -in. spindles to fit a No. 1 drill chuck. The spindle speed is from 1700 to 2700 r.p.m., its net weight is 1200 lb. The No. 2 machine is designed for ordinary small work where high speed is not required. It will drill holes up to $\frac{5}{16}$ in. in diameter and $1\frac{1}{4}$ in. deep. It has a 1-in. spindle to fit a No. 2 drill chuck. The spindle speed ranges from 1000 to 1500 r.p.m. This type is furnished either with legs or with a base, its weight with legs being 850 lb., and 1200 lb. with bed. Both machines occupy a floor space 35 x 42 in.

A Square Double-Seaming Machine

Charles Leffler & Co., Brooklyn, N. Y., have added a new size of automatic square double-seaming machine to their line. It is intended primarily for the smaller sizes of double seamed tin cans, such as are used as containers for tobacco, cocoa, talcum powder, etc. Several new features have been added to the usual construction employed by this company.

The machine is driven by a two-step cone pulley engaging an automatic friction clutch. All that is required of the operator is that he place the can on the chuck and depress the treadle which causes the lower spindle to rise and engages the clutch, thus starting the driving shaft and the chuck spindle. The double seaming rolls are brought into action automatically, while the can is making the required number of revolutions. After this, the clutch disengages automatically, the spindles stop and the plate drops. The mechanism controlling the double seaming rolls has been designed so that

the seam can be completed in five revolutions of the can. A new type of band brake has been applied to the machine, so that when the cycle of operations is completed the brake will act instantaneously. In this way, it is pointed out, that the time required to complete each can has been reduced to a minimum.

The upper and lower spindles are driven in unison from the main driving shaft through gears. The lower chuck is raised to clamp the can by a new cam motion, which operates before the friction clutch is thrown into contact. It is emphasized that for this reason the pressure required to start the machine is small and only a short stroke of the treadle is necessary. These two features combine to make only a comparatively little exertion necessary on the part of the operator, even though the can is not a very high one.

The machine will handle cans with ends measuring from $\frac{3}{4}$ to 6 in. across the corners and from 1 to 10 in. high. Two adjustments suffice to change the machine for a new size of can. A variation in the shape of the can is taken care of by changing the chuck, while the adjustment for height is made by raising or lowering the machine table by the handwheel at the side. A new adjustment has been added to the upper spindle for taking care of any variation that might occur in the height of the chucks. This adjustment is controlled by a single nut at the lower bearing of the spindle and can be made quickly.

Recent Molding Machine Achievements

A Western manufacturer of molding machines is authority for the following interesting comparison of costs on several pieces of foundry work, as made up by hand and by machine.

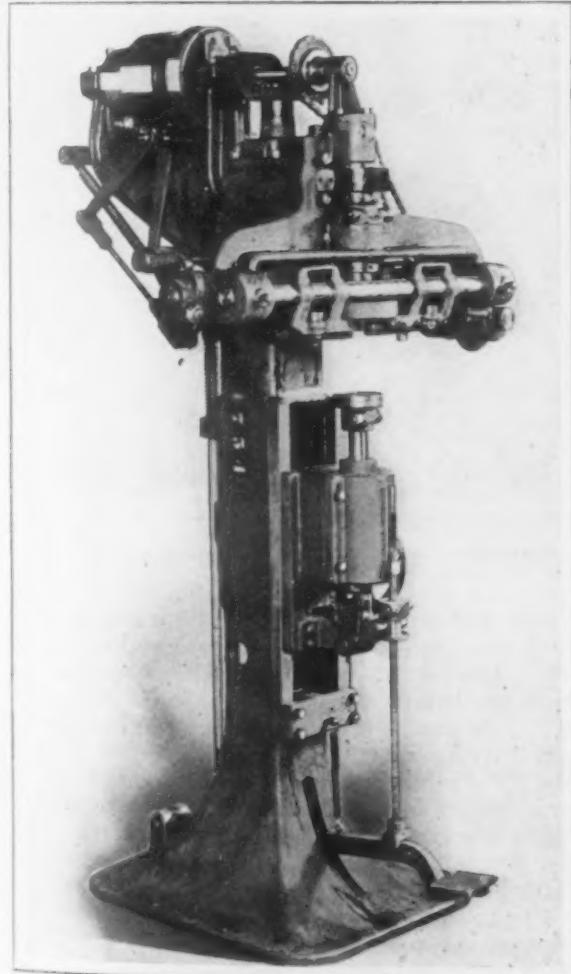
The first job mentioned was a rub iron for wagons. This work had formerly been done by hand, 4 pieces on a gate. The average production was 70 molds per day, or a total of 280 pieces, at a cost of \$3.30. The pattern for the machine was arranged to cast 6 pieces on a gate, and the production was increased by the use of the molding machine to 116 molds, or 696 pieces. The cost of producing the 696 pieces was only \$3.48, or a total increase of 18 cents, for which an increase of 416 pieces was secured. This represents a reduction of nearly 60 per cent. in cost.

A second job was the molding of a small sprocket wheel, the production of which, on the bench, ran from 12 to 15 molds per day. This production was increased to 90 molds per day at a cost of 4c. per mold; each mold required the setting of 4 cores and 2 steel shafts.

A third instance was that of a door shoe, the average production of which was about 60 pieces per day on the bench. This job required the setting of 12 cores in each mold, but the daily production on a machine was so heavily increased that it ran up to 260 pieces.

In the production of large sprockets and hand wheels for road scrapers, the use of a combined air squeezer and jolter machine increased the output from 15 molds per day, at a cost of 22c. per mold, to 70 molds per day, at a cost of about 6 $\frac{1}{2}$ c. per mold.

These records are of comparatively recent making and go far to indicate that almost any foundry still offers a field in which the manufacturer may find opportunity for lowering his costs by the adaptation of his work to the proper type of molding machines.



A New Size of Automatic Square Double Seaming Machine Developed for Small Cans

A 20-IN. DRILLING MACHINE

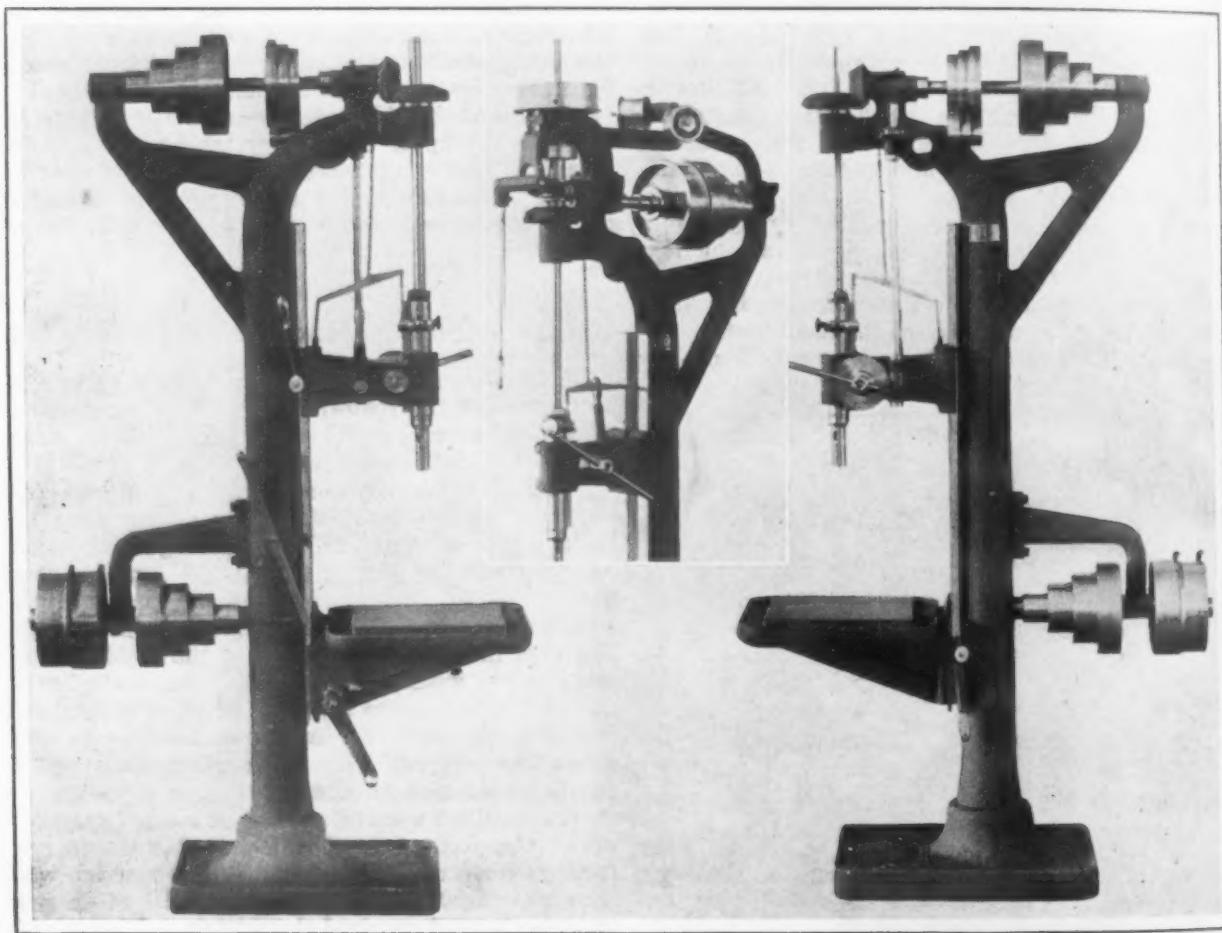
The New Sliding Head Power Feed Tool of the Superior Machine Tool Company

To manufacturers requiring high speed drilling and tapping machines for work up to $\frac{3}{4}$ in. for drills and $\frac{1}{2}$ in. for taps, where unusual accuracy of machining is incorporated in the design of the tool, the new 20-in. high-speed sliding head type of drilling machine recently placed on the market by the Superior Machine Tool Company, Kokomo, Ind., will be of interest. The bearings of this tool are bronze bushed throughout, no babbitt metal bearings being used. It is thus apparent that the alignments of the machine are secured by an original accuracy in the machining of the parts, rather than by working out the bearings to take up inequalities. The bronze bushings also offer an advantage in that a worn or damaged bearing may

enable an operator to disengage the reverse driving mechanism when it is not in use.

The power feed construction is simple, the power being transmitted directly from a horizontal high-speed shaft through a cone driving pulley of large diameter to a small cone pulley with a worm and worm gear fulcrumed on the yoke, and thence through a vertical feed shaft at the lower end of which a second worm engages with the worm gear of the spindle feed shaft. The lower worm is brought forward into engagement with the worm gear by a handle at the left side of the sliding head. This handle when engaged with a trip finger applies the power feed to the spindle until the adjustable stop on the sleeve comes into contact with the trip finger, when the power feed is automatically disengaged. An adjustable feed lever is mounted on the end of the spindle feed shaft for hand feed or for use with the tapping attachment.

The column of the drill is tubular in cross-



Two Views of a High Speed Drilling and Tapping Machine of the Sliding Head Type Equipped with Power and Lever Feed and a View of the Upper Portion of the Lever Feed Machine

be replaced without disturbing the original alignment of the machine, and with practically no loss of time.

Various views of this drilling machine, which is furnished with plain lever feed or with lever and power feed are presented. The equipment also includes a friction tapping attachment, which constitutes a particular feature of advantage. It consists of an intermediate clutch mechanism with a single lever, by which the spindle can be thrown into engagement either with a friction in the crown gear to give the proper advance of the tap or a similar friction in reverse pulley for backing out the tap. The reverse operates at approximately twice the speed at which the tap advances. A dental clutch is furnished on the top horizontal shaft to

section, and is provided with a dovetailed face, to which are clamped the sliding head and adjustable table. The column face is planed and scraped into alignment before the column is bored for receiving the removable bronze bushings which carry the lower driving shaft, top shaft and crown driving gear. The sliding head is machined complete in a special fixture, and is counterbalanced by a counterweight in column. It is clamped to the column face by a dovetail gib and is provided with a suitable adjustment for the take-up of the spindle sleeve.

The table is raised or lowered by a rack and pinion actuated by a handle at the left side and is supported in any desired position by a ratchet and pawl. The working surface of the table is milled and is entirely surrounded by a large oil groove.

A binder lever, as shown, clamps the table rigidly to the column face. The spindle is forged from high-carbon crucible steel and finished by grinding. It is provided with a ball thrust bearing at the lower end of the sleeve and with a bronze friction nut and hexagon jam nut at upper end of sleeve. The sleeve is bronze bushed, finished on the outside by grinding, is graduated in inches and fractions and is connected with the spindle feed shaft by a steel rack, as shown. A substantial depth gauge is furnished which extends entirely around the sleeve and rack and is held by compression. It is often desired to do counterboring with the lever feed after the power feed has been disengaged.

The drill affords a range of four speeds, 110, 235, 460 and 990 r.p.m., and the power feeds available will advance the spindle at the rate of 0.0055, 0.0081, or 0.0135 in. per revolution of the spindle.

A Two-Spindle Bench Drilling Machine

A combination 12-in. two-spindle bench drilling and tapping machine has been placed on the market by the Pioneer Machine Company, Rockford, Ill. It is adapted for manufacturing purposes and the maximum drilling capacity is $\frac{1}{2}$ in. and $\frac{3}{8}$ in. for tapping. Ordinarily, the spindle at the right is



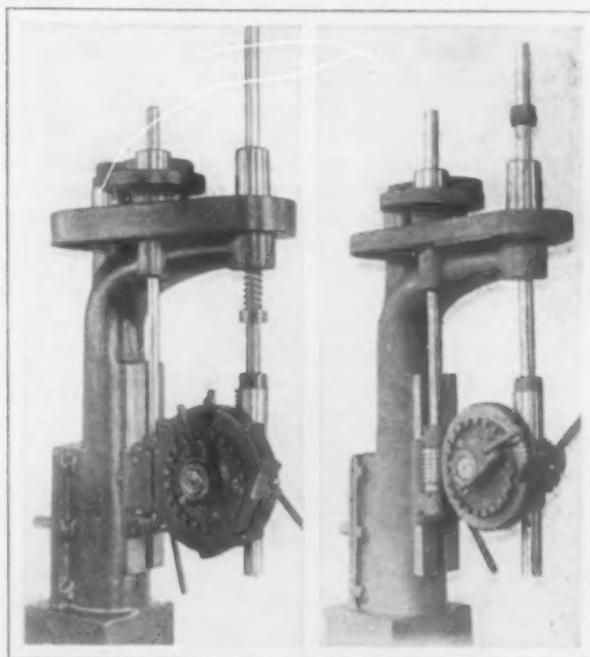
A 12-in. Two-Spindle Combination Bench Manufacturing Drilling and Tapping Machine

used for drilling and the one at the left for tapping, or if desired, the latter can be used for drilling or reaming by raising the sliding rod in front of the machine to its highest position, and taking off the lower dog on the rod. For ordinary work a table is used, but if greater capacity is desired the front portion of the base, which is planed, can be used instead.

The R. L. Ginsburg Sons Company, dealer in iron, steel and metals, 909 to 911 Greenwood avenue, Detroit, Mich., desires to correct the report in circulation that it has discontinued business. The company has closed its office at Buffalo, but is still doing business as usual at Detroit.

A Completely Guarded Drilling Machine

The guarding of machinery against danger to the workman has progressed very rapidly in recent years until in many cases the period of striving for refinement has been reached. A typical case to



A Recently Developed Drilling Machine in Which the Power Feed Worm and Worm Gear Are Guarded and the Earlier Type of Machine

demonstrate the point is that of the manufacturers' drilling machine of the Taylor & Fenn Company, Hartford, Conn. In the older type of machine every moving part was completely guarded except the worm and worm gear of the power feed. In the new machine a man could not hurt himself unless he deliberately placed his hand beneath the drill as it descended. Both the worm and the worm gear are completely incased.

This machine, which is known as the type C, is the same as the type A in design with the addition of the automatic power feed. Each spindle has independent automatic power feed with quick return, and the mechanism may be applied to type B machine, to feed all spindles simultaneously.

The power feed may be used to advantage in drilling deep holes from $\frac{3}{16}$ to $\frac{3}{4}$ in. in diameter, with a maximum depth of 3 in. It may be disengaged and the spindle operated by the hand lever if desired. Power is applied to the feed pinion by a worm gear and worm which are driven by spur gears directly from the rear shaft. In this way it is possible to operate the feed only when the spindle is in motion.

The worm gear has a hardened steel center in which notches are cut to form a clutch ring for receiving the driving lever and which runs free on a bronze bushing when the driving lever is disengaged. It is always in mesh with the worm so that the wear is distributed evenly over the teeth. The driving lever is fastened to a clamp by a collar that fits the octagonal end of the feed pinion shaft, thus permitting eight settings of the feed lever. The range of feed may be changed quickly by loosening the binder screw, slipping off the clamp collar and replacing it in the position that will give the lever the maximum travel to the knock-off. The lever is disengaged from the clutch ring by a hardened knock-off which has an adjustment greater than the distance between the notches on the clutch ring and may be set accurately to drill holes of a given depth.

A Small Three-Cylinder Diesel Engine

What is said to be the first oil engine operating on the Diesel principle and having an output below 75 hp. that has been designed and built in the United States has been brought out by the Fulton Mfg. Company, Erie, Pa. The engine operates on the four-cycle principle and has three cylinders, 8 in. in diameter with a 9-in. stroke. When running at 400 r.p.m., 50 hp. is developed.

A good idea of the general arrangement of the engine is presented in the accompanying illustration. The control wheel and starting handle are shown in the left with the force feed oiler for cylinder lubrication between the first two cylinders, the air compressor at the extreme right and the battery of pumps for water, fuel, crankcase lubrication, etc., mounted on the compressor end of the crankcase. The parts are arranged so that each individual cylinder or head can be removed without disturbing the camshaft, which is mounted on a

sure cylinder through a slotted strainer and forces the duplex valve from its seat. This valve closes on the compression stroke and the delivery valve is forced open, allowing the air to enter the cooling coil. This arrangement is somewhat novel, as it combines the strainer and suction and delivery valves and in addition the air drawn through the delivery valve has a cooling effect on the parts that might cause trouble from overheating. The air-valve pocket and the cooling coil are both surrounded by water and the latter may be inspected without breaking any of the pipe connections or dismantling.

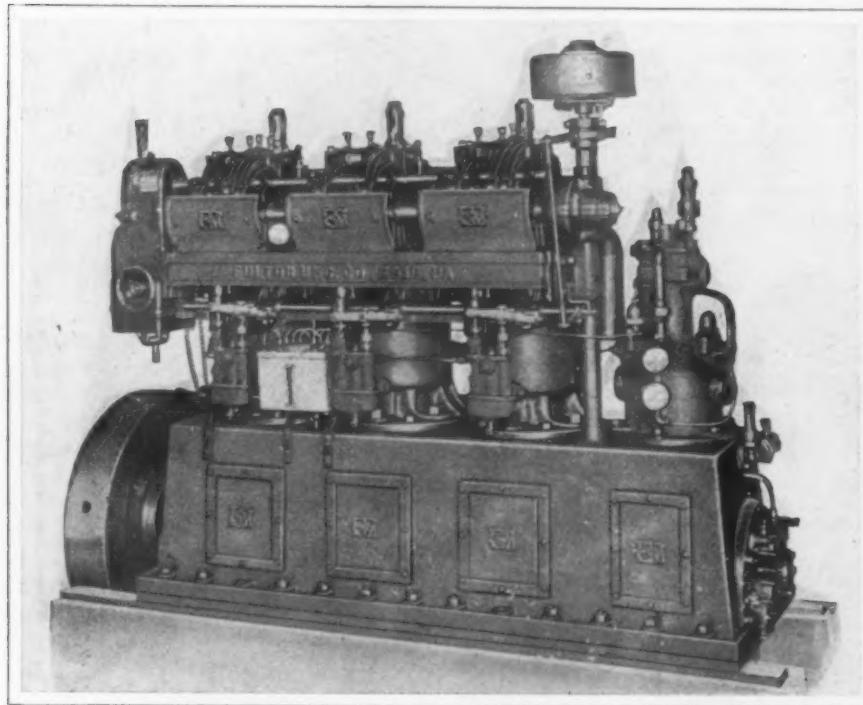
The oil is delivered to the fuel chamber around the needle valve by a fuel pump, where it is broken up by passing through a series of perforated disks. Air from the high-pressure receiver enters the fuel injector and atomizer, and when the needle valve is raised the fuel charge is blown into the compression space of the working cylinder, where it is ignited by the heat of compression. The compression spring at the top holds the needle valve to its seat and a renewable burning plate is attached to the lower end by a cone-shaped nut, which is automatically locked in the cylinder head when the injector is installed. There is a set of spiral grooves at the lower end of the atomizer which are relied upon to give the injection air a whirling motion and to clean out all the fuel as well as complete the breaking up process which was begun by the perforated disks.

The governor employed is of the flyball type and is fully inclosed, having an outside adjustment for the spring tension. It is mounted on the vertical shaft between the crankcase and the gear housing, and all the exposed parts are stationary. The end of the governor arm has gear teeth that mesh with a pinion on the control shaft of the fuel pump, and a small movement of the rack is sufficient to rotate the control shaft enough to give the full range

of regulation for the control valves. The timing of the control valve is accomplished by a sliding cam which rotates at the same speed as the camshaft. While the rotary movement of this cam and its supporting members are subject to the speed of the engine, the control shaft which governs the position at which the cam is effective is subjected only to the movement of the governor and its connections. If desired, the fuel pumps can be operated by hand without disconnecting the driving mechanism.

The control is secured by a handle and handwheel supplemented by interlocking push buttons which are connected with the handle so that the starting air and fuel cannot be supplied to a given cylinder at the same time. The handwheel serves to put more or less load on the governor, thus increasing or decreasing the speed.

Forced lubrication is supplied to all crankshaft bearings and wrist pins and a small self-priming rotary pump circulates oil from the engine bed to the bearings located inside the crankcase and up through the hollow connecting rod to the wrist pin. The arrangement is automatic with the starting and stopping of the engine.



A Recently Developed Three-Cylinder Four-Cycle 50-Hp. Diesel Engine

continuous support bolted to lugs cast on the cylinders. The shaft is driven from the crankshaft by an intermediate vertical shaft having helical worm gears. Hess-Bright ball bearings running in an oil bath are provided for the gear end of the camshaft and also for the vertical shaft.

The air used for fuel injection is drawn into the lower cylinder of the air compressor through the strainer and duplex suction and delivery valve, and is compressed to about 120 lb. per sq. in. and delivered to the intercooler. From here it passes to the suction valve in the cylinder head, where it is drawn into the high-stage cylinder and delivered through the high-pressure delivery valve to another cooler and finally stored in the receivers. The delivery of the compressor is slightly in excess of the quantity required for fuel injection and the surplus is carried in two larger receivers for starting. The air for fuel injection is used at a pressure of from 800 to 1000 lb. depending on the load, the former figure being for half load and the latter for a 10 per cent. overload. The air in the starting receivers is carried at a pressure of from 700 to 1000 lb. During the suction stroke the air enters the low-pres-

PERSPECTIVES OF MACHINES

How Sales May Be Helped When Photographs Are Impossible

BY N. G. NEAR

The writer was once connected with a company that manufactured a large special machine which was shipped away without first making a photographic print of it. An inquiry was received from a foreign prospective customer who asked for a photograph of a machine that would do his work. My company decided that its unphotographed machine was just the thing, so wrote the purchaser of the original for a photograph, offering to cover all costs. The purchaser replied that the position of the machine in his shop was such that a photograph was impossible, and he expressed his regrets. My employer thereupon ordered the patternmakers to build a wooden model of this machine from the blueprints, thinking such a course to be the only solution of his problem. The model cost \$25. He then employed a photographer at a cost of \$8 to go out to the works and make two large prints of the model. After that a retoucher was paid \$10 to put the photographs in shape preparatory to making a likeness in print that would give the machine an iron-like appearance. Total cost, \$43.

In spite of the retouching this photograph has never looked just right. The machine itself was about 20 ft. high, while the model was only a foot high. Consequently an entirely different perspective was obtained by the camera than would have been the case had the machine itself been snapped. The model-picture is such an obvious fake that I believe its spoils its advertising qualities. A skilled artist could have made up a perspective drawing from the blueprints for about \$30, and I am sure the finished article would have looked more natural than does the present photograph.

The company did not make a sale to the foreign prospect despite the expense incurred in making a photo. Whether the faked photo was the cause of this lost sale or not, I cannot say. Nevertheless, the photograph has more than paid for itself since.

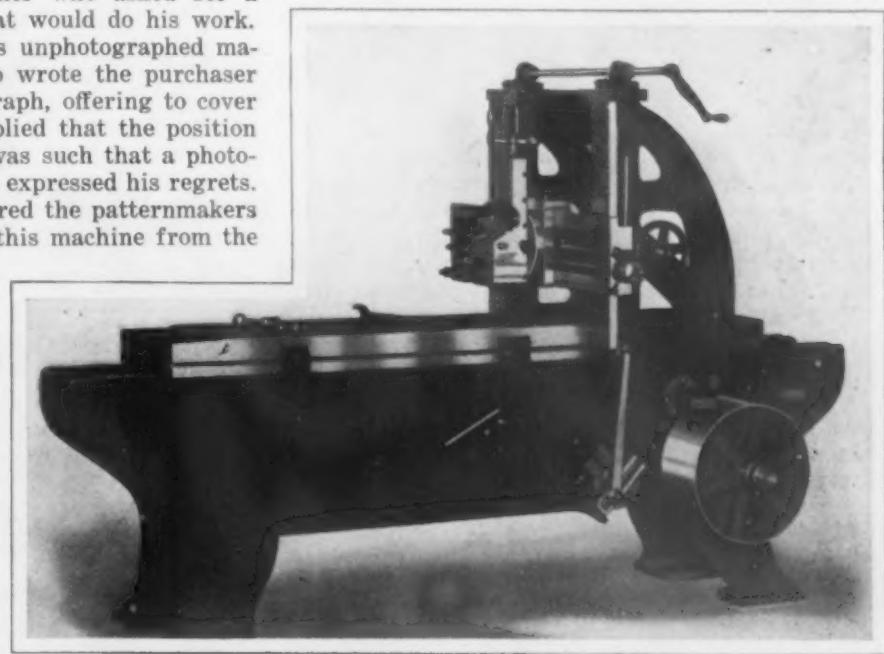
Where it is desired to reduce the cost of drawings as much as possible it is not poor practice to color in a plain elevation drawing, omitting perspective entirely. These can be made directly from blueprints of an assembled drawing. A perspective, of course, appeals best because it bears less evidence of having been faked, but perspective drawings are not always an absolute necessity any more than is a plain elevation. The most luxurious is not always the most desirable.

Because the Wakamatsu plant in Japan has lately succeeded in making steel wire which formerly had to be largely imported, and because the customs tariff revision of 1911 nearly doubled the duty on nails, their manufacture may soon be firmly established there. Over 1200 tons of nails per month are now produced in Japan. Until recently the value of the imports of nails was £306,250 per year, the American product accounting for the greater part of this, with Germany second.

A HEAVY PLANING MACHINE

A 17 x 20 In. Machine, with Second Belt Drive, Designed for High Speeds

A 17 x 20 in. planing machine has been placed on the market by the Whitcomb-Blaisdell Machine Tool Company, Worcester, Mass., to replace its 17 x 17-in. machine. The object was to create a heavier machine. The weight is about 1000 lb. greater, and all the parts are from new patterns of greater di-



A 17 x 20 In. Planing Machine with a Second Belt Drive Designed for Operation at High Cutting Speeds

mensions to meet the higher requirements of the latest machine shop practice. The machine is furnished in lengths of bed from 4 to 10 ft. It will take work 21 in. between housings and 17 in. under the cross-rail. The platen can be run at high cutting speeds, the company's recommendation for bronze being 100 to 115 ft. per min. Not only is the machine valuable for toolroom work, but also for manufacturing planing operations up to the limit of its capacity.

From a mechanical standpoint the machine contains a number of important improvements over its predecessor. It has the second belt drive which characterizes the company's larger machines. The intermediate pinion and gear of the driving train are of the spiral type, which combine with the second belt to eliminate high-speed spur gears and to produce quiet running. An improved type of belt shifter cam has been incorporated into the design, boxed in on the inside of the bed where it is completely protected from dirt and chips and out of danger from breakage. The machine has all the features of the company's larger machines, including the Whitcomb cross-head fastener, the shipper dogs, which are self-acting and are released by a slight pressure of the finger and the self-relieving friction box driven by a silent chain which works without drag when feeding. If desired, an automatic stop for the vertical, angular and cross power feeds is applied, acting with precision. This device is of special value in toolroom work.

The effort has been made to get a rigid, powerful drive for a small machine. To assist this purpose the shaft bearings are especially long and wide, and the driving pinion is supported directly to the shoulder of the gear. The bearings are self-oiling,

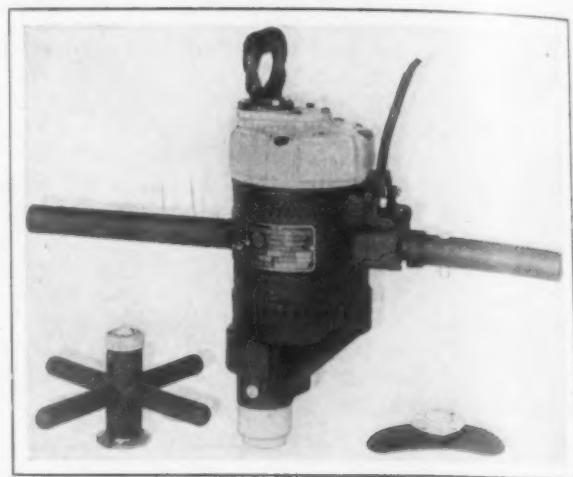
and the ways of the bed have self-oiling rolls. If desired, the machine is equipped with motor drive. A 2 or 3 hp. motor is used, depending upon the character of the work and the speed required. It is mounted on the housings and belted directly to the driving pulley, or on the floor, or on a bracket fastened to the bed. When either of the last two forms of mounting is used, the belt is run to a self-contained countershaft.

Electric Grinding and Reaming Tools

The line of direct-current portable grinding machines brought out by the Van Dorn Electric Tool Company a few months ago and illustrated in *The Iron Age*, March 27, 1913, has been followed by a line of alternating-current machines equipped with motors of the same size, 1/3 hp. This line consists of five types, a bench machine, a tool post machine and an aerial machine with end and body handles and an aerial machine with extensions. It is designed to operate on 60-cycle alternating current only, either single or split phase, on either 110 or 220 volt circuits at a speed of 3400 r.p.m. The machines may be connected to any ordinary light socket.

The bearing for the wheel end is designed to permit the adjustment of the bearing to the shaft, means being provided for compressing as well as expanding the bearing for the desired running fit. This adjustment is secured by a pressure cap, which, when loosened from the adjusting nut and bearing bushing, will permit movement in every direction for adjustment. When the proper adjustment is secured the pressure cap is again tightened to hold the bearing in place. Longitudinal adjustment is accomplished by a double end thrust bearing, having a dial cap. By depressing a poppet pin the dial can be moved in either direction to ob-

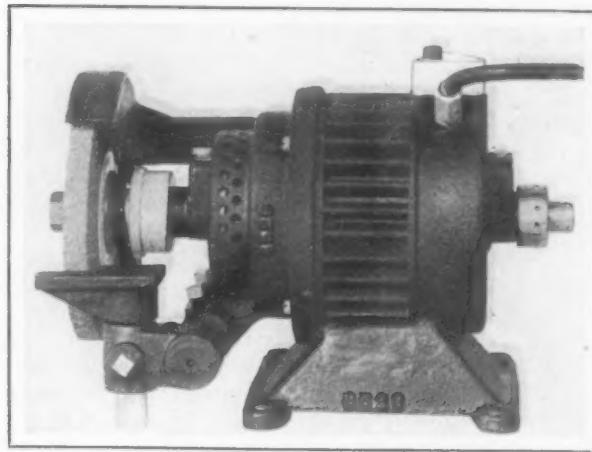
extension from the motor housing to the face of the wheel. The rotor shaft is made of two parts of alloy steel ground to size and the inner end of each part is suspended in annular ball bearing to secure perfect alignment. The various types of machines



A Reaming Machine for All Around Work Equipped with a Direct-Current Motor

are equipped with wheels 6 in. in diameter with a $\frac{3}{8}$ -in. face. In addition the tool post grinding machine is furnished with a wheel $1\frac{1}{4}$ in. in diameter and a face $\frac{1}{4}$ in. wide for internal work. The equipment of each machine includes 10 ft. of cable and a fused plug for connection with electric light socket.

A new reaming machine designed for all around work and operation on direct-current circuits has also been brought out. This is a high-speed light weight machine and is intended to be handled by one man. It is designed particularly for 13/16-in. reaming, but can be used for drilling up to 1 in. in steel with high-speed steel twist drills or for drilling $1\frac{1}{2}$ -in. holes in wood. The tool is 6 in. in diameter and is $1\frac{1}{4}$ in. long. Its weight is 40 lb. A change, which has been made by the company, is embodied in the construction of these machines. Formerly the cable entered the motor housing, but now it enters through a switch box and a terminal block. It is pointed out that in this way it is possible to take up the cable easily in case of breakage and it is not necessary to disassemble the machine. This change in the manner of bringing in the cable is to be embodied in all of the machines of the company in the future.



A Direct-Current Portable Grinding Machine in Which the Cable Supplying the Current Is Attached to a Terminal Block

tain the desired adjustment. The wheel end bearings are phosphor bronze.

The bench machine illustrated is designed for grinding small tools and buffing and polishing, and the tool post type is intended for external grinding in a lathe, surface grinding in a planing or shaping machine and cutter grinding. An internal grinding attachment, cutter rest and two emery wheels are furnished with this machine. The aerial type, which has handles that can be adjusted for any position, is intended for general grinding, buffing and polishing work in a foundry, machine or car shop. The aerial grinding machine with extensions is adapted for grinding castings, dressing the interior of castings and polishing. It has a 12-in.

Germany's Steel Output in 1913

Statistics compiled by the Verein Deutscher Eisen- und Stahl-Industrieller show that the total production of steel in Germany during 1913 was 18,958,819 metric tons. This is an increase of 1,656,821 tons, or 9.58 per cent. over the production of 1912, which was 17,30,998 tons. The increase in 1913 over that of 1912 was 625,844 tons less than the increase of 1911 over 1912. The following table gives the details of the production for 1913 and 1912 in metric tons:

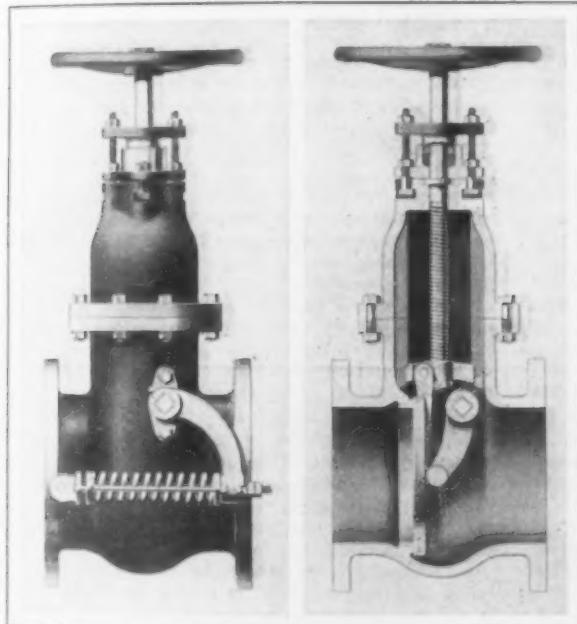
	Acid steel		Basic steel	
	1913	1912	1913	1912
Bessemer ingots . . .	155,138	187,179	10,629,697	9,794,300
Open-hearth ingots . . .	270,826	194,924	7,339,314	6,650,565
Steel castings	109,329	100,332	253,587	221,331
Totals	535,293	482,435	18,222,598	16,666,196

The increase is almost entirely in basic steel, acid Bessemer ingots alone showing a decrease of 32,041 tons. The production of crucible steel in 1913 was 99,173 metric tons as compared with 79,190 tons in 1912, an increase of 19,983 tons. In electric furnace steel, the production in 1913 was 101,755 tons, against 74,177 tons in 1912, an increase of 26,578 tons or 26.11 per cent.

A New Swinging Check and Gate Valve

A new valve which embodies the features of a gate and check valve in one piece of apparatus and is capable of performing the functions of either has been placed on the market by the Nelson Valve Company, Chestnut Hill, Philadelphia, Pa. This valve, which is known as the Nelson-Erwood swing gate valve, is designed for use as a back pressure valve to the atmosphere, an atmospheric relief valve on condensing engines and turbines; safety gate valve on exhaust lines of engines, turbines, pumps, hammers and elevators; non-return valve between cylinders and condensers, and open heaters and engines and turbines; a safety gate valve on air compressor lines, a self-cleaning foot valve on a pump suction and a combined check and gate valve on the pump discharge.

The action of the swing gate is controlled by a spring outside of the valve casing, the tension being regulated for the pressure desired. The action of the gate valve is controlled by the handwheel, which raises the gate above the valve openings, thus giving a straightway opening with no obstruction in the pipe. The face of the gate and the seat ring, both of which are made of bronze, are flat. It is



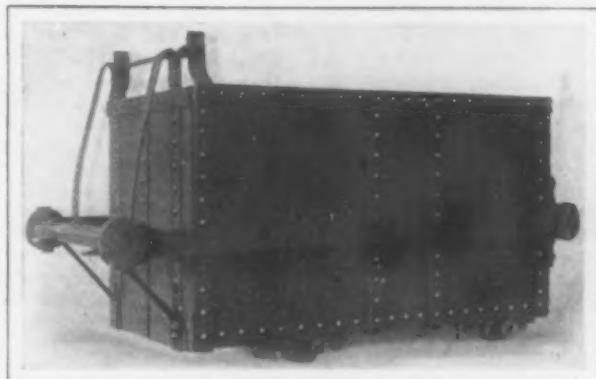
Two Views of a New Valve Which Combines the Features of a Check and Gate Valve and Can Perform the Functions of Either

pointed out that the gate and seat are self-cleaning by the action of raising and lowering the gate, so that any foreign matter which would otherwise prevent closing will be wiped or sheared off.

The A. S. Cameron Steam Pump Works, 11 Broadway, New York, announces the opening of branch offices and warehouses in the following cities: Birmingham, Ala., American Trust Building, H. M. Perry, manager; Chicago, Peoples Gas Building, M. P. Frutchey, manager; Cleveland, Williamson Building, W. A. Armstrong, manager; Duluth, Minn., Providence Building, S. H. Hill, manager; Houghton, Mich., Thos. F. Lynch, manager; Knoxville, Tenn., Holston National Bank, F. L. Thompson, manager; Los Angeles, Cal., W. A. Townsend, manager; Philadelphia, Arcade Building, Phil. Weiss, manager; Pittsburgh, Farmers Bank Building, W. B. Brendlinger, manager; St. Louis, 300 North Broadway, A. A. Bonsack, manager; Seattle, Wash., Colman Building, R. W. Douglass, manager. These branches will carry a stock of Cameron pumps and repair parts.

Using Skips for Haulage in Iron Mines

An exceptionally heavy skip has been constructed by the Orenstein-Arthur Koppel Company, Pittsburgh, Pa., for the MacIntyre Iron Company,



An Exceptionally Heavy Skip Having a Capacity of 5 Tons of Ore Intended for Use on a Tipple

for use at the latter's mines in the Adirondack region of New York State. These skips have a capacity of 68 cu. ft., or 5 tons of ore. When they reach the top of the tipple the rear of the skip is elevated and the front end depressed. With the skip in this position the links or hauling bars permit the door to swing open and when the rear end is lowered the door closes, thus making it unnecessary for the operator to pay any attention to the locking or unlocking of the door.

German Iron Trade Notes

The production of pig iron in Germany in February was 1,445,911 metric tons, which is the smallest make for any month since June, 1912. It was 120,500 tons less than for January, but the daily rate of production was, as usual in February, higher than in January, having been 51,625 tons, against 50,530 tons in January. The daily make in February, 1913, was 53,353 tons. It is claimed that the stocks of iron at the furnaces did not increase in February.

Considerable importance is attached in the trade to a report from St. Petersburg, according to which the Russian Government will within a few days issue a decree permitting the import of 250,000 tons of pig iron from Germany at one-half the present duty. From the Briey district in France comes news that stocks of iron are accumulating at the furnaces rapidly, and the blowing out of further furnaces is seriously considered.

The Prussian railroad authorities have closed contracts with the Steel Syndicate for rails for the fiscal year beginning April 1. The price is understood to be somewhat less than that paid under the contracts of the past year—118 marks (\$28.08) but the quantity to be taken is larger.

The Rombacher Hüttenwerke, Lorraine, has leased the Concordia Coal Company's mines for a term of years, with the right to acquire them later. Rombacher is the most important of the larger iron works of Germany without a coal supply of its own and the Concordia (at Oberhausen near Essen) is one of the most important coal companies not attached to iron works, producing yearly about 1,500,000 tons of coal and 330,000 tons of coke. Rombacher makes yearly about 770,000 tons of pig iron and hitherto has been making only a little more than 200,000 tons of coke in a coking plant of its own. Rombacher has long complained in its annual reports of the high prices it had to pay the Coal Syndicate for coke.

The Deutsch-Luxemburg Company is preparing to bring out an issue of bonds amounting to 20,000,000 marks (\$4,760,000) to pay for recent extensions of its works and the Hoesch Company will issue bonds to the extent of 4,000,000 marks (\$952,000).

Trade Publications

Steel Factory Furniture and Equipment.—Angle Steel Stool Company, Inc., Otsego, Mich. Catalogue No. 114. Lists a line of angle steel office and factory stools, chairs, work tables, trucks and galvanized iron trays or pans. All of these specialties are illustrated and briefly described, and mention is made of the special angle steel products that can be supplied to order for factory and office use. A partial list of users and a number of testimonial letters are included.

Counting Machines and Elevating Trucks.—National Scale Company, Chicopee, Mass. Catalogue. Calls attention to a system to cut the cost of counting, weighing, checking and estimating operations and handling economically all the loading, unloading and trucking problems by employing counting and weighing machines and elevating trucks. What the trucks and machines will do is briefly stated and the advantages of using them are pointed out. After this the several types made of each are illustrated, the trucks being shown on the left-hand pages with the counting and weighing machines on the facing ones. Instructions for operating the machines and trucks are included, and there is a list of factories of different kinds in which the counting machines are used. Brief specifications of different machines and trucks are given under the illustrations.

Rotary Compressor or Vacuum Pump.—Crowell Mfg. Co., 298 Taaffe place, Brooklyn, N. Y. Circular No. 103. Refers to the use of a special rotary compressor or vacuum pump for use in laboratories and other experimental work. The pump which is fitted in an oil immersion box is used chiefly for vacuum work and can exhaust to a vacuum of from 29 to 30 in. of mercury, according to the atmospheric conditions. Views of the pump, with and without the oil box, are given, and extracts from several testimonial letters are included.

Steam Generator and Tire Setter.—Keokuk Hydraulic Tire Setter Company, Keokuk, Iowa. Two circulars. The first gives general description and specifications for a steam generator, in which the under part of the base forms a water pan as well as an ash pan. The other circular is devoted to a line of hydraulic cold tire setters and contains illustrations of the four sizes regularly built with brief specifications. A general description of the construction of these machines and testimonial letters are included.

Drills.—Cleveland Twist Drill Company, East Forty-ninth street and Lakeside avenue, Cleveland, Ohio. March issue of Drill Chips, the recently inaugurated house organ of this company. The eight pages of the magazine gradually increase in length from the front to the back and each has an engraving of one of the company's drills at the bottom. An advertisement on the reverse side of one of the pages has a border of drills and mention is also made of a line of high-speed reamers.

Coal Drills.—Chicago Pneumatic Tool Company, Fisher Building, Chicago, Ill.—Bulletin No. 150. Calls attention to a line of coal drills which are operated by compressed air or electricity, and are either mounted on a drill frame or held by hand. Views of different drills are given with brief descriptions of their construction.

Oxy-Acetylene Welding.—Wilkes-Barre Welding Co., Wilkes-Barre, Pa. Pamphlet. Describes the process of oxy-acetylene welding and its uses and gives information on the cost of the apparatus. A view of the apparatus employed is given, and there are several engravings of castings that have been repaired in this way.

Direct-Connected Exhaust Fans.—Emerson Electric Mfg. Company, St. Louis, Mo. Bulletin No. 3508, replacing bulletin No. 3507. Calls attention to a line of powerful exhaust fans, as well as ventilating fan motors for both alternating and direct current. The advantages of the exhauster for providing a supply of pure air are briefly touched upon, followed by information regarding the size and location of fans to be installed. Brief descriptions of the exhaust fans are given, together with specification tables of the different sizes and styles.

Producer Gas.—Smith Gas Power Company, Lexington, Ohio. Pamphlet. Treats of the application of cold, cleaned producer gas to high temperature regenerative furnaces, and points out the advantages of the Smith system of generating and distributing producer gas. These advantages are grouped under two general headings entitled "Practical" and "Technical." Under the first are given the general advantages which are obvious to a casual observer, while under the other is given a résumé of the advantages which are not immediately apparent. Considerable information on the efficiency of maintenance of operation, generating gas, distribution and utilization at the furnace is also included.

Hydraulic Presses and Pumps.—Hydraulic Press Mfg. Company, Mt. Gilead, Ohio. Catalogue No. 40. Size, 8 1/2 x 11 in.; pages, 128. Illustrates and describes a line of hydraulic presses and pumps for all high-pressure purposes. The

presses illustrated include one for straightening steel castings and a structural steel straightening press which were illustrated in *The Iron Age*, December 18, 1913, and February 24, 1914, respectively.

Charcoal Iron.—Lake Superior Iron & Chemical Company, 423 Penobscot Building, Detroit, Mich. Pamphlet. Describes the furnaces and products of this company. Views of all of the plants are given, and there are a number of smaller illustrations showing steps in the manufacturing processes.

Portable Electrical Instruments.—Wagner Electric Mfg. Company, 6400 Plymouth avenue, St. Louis, Mo. Bulletin No. 104. Pertains to a line of portable instruments for use in connection with electrical testing work. Detailed descriptions of the instruments and their uses are not given, the bulletin being confined to general statements of the underlying principles and the conditions under which the degree of accuracy of indication and the permanency of calibration are effected. Considerable space is devoted to general notes on electrical testing, this section containing explanations of many simple and useful tests with diagrams of connections and suggestions for securing accurate results.

Metal Working Machinery.—Garvin Machine Company, Spring and Varick streets, New York City. Catalogue Size, 4 x 6 1/2 in.; pages, 322. Illustrates and describes a complete line of metal working machines, including lathes, milling, die and screw slotting, tapping, drilling, cutter and surface grinding and screw machines, wrenchless chucks and special machinery. For the most part two pages are given to each machine, an illustration with data on the capacity, weight and code word being given on one page, with a condensed description and specification table on the facing one. There are about 20 pages of tables and useful information, and code and alphabetical indices are included.

Air Compressor Governor.—General Electric Company, Schenectady, N. Y. Bulletin No. 44,590, superseding No. 4427. Describes an automatic governor for automatically controlling the operation of either stationary or railway motor-driven air compressors to maintain the air pressure in a storage reservoir between predetermined limits. A brief description of the governor is given, together with exterior and sectional views.

Ball Bearings.—Rhineland Machine Works Company, 140 West Forty-second street, New York City. Catalogue No. 8 and circular. The former relates to a line of ball bearings of the radial, self-aligning, adapter and thrust types. Drawings illustrating the construction of all these bearings are given, together with a number of tables of dimensions. The circular deals with a double ball bearing hanger box, which is adapted for use in any standard hanger frame. Views showing the construction and mounting are given, together with directions for installing and a table of dimensions.

Centrifugal Pumps.—Providence Engineering Works, 521 South Main street, Providence, R. I. Booklet. Describes some of the essential details of the company's pump, which is made in two styles, the double suction for generating moderate heads and the multi-stage for generating greater heads or pressures. The theoretical considerations which must be taken into account in designing any centrifugal pump are first touched upon, followed by an illustrated description showing how this pump has been designed to meet the theoretical requirements, as well as those relating to practical operation, accessibility and ease of handling.

Metallurgical Apparatus.—Sauveur & Boylston, Abbot Building, Cambridge, Mass. Circulars I and M. The former refers to an inverted mettalloscope, which possesses the special features of compactness and convenience of adjustment as well as the permanent connection with the camera by a totally reflecting prism. The other circular points out the advantages of using a photomicrographic outfit with the microscope, camera and illuminant mounted on one solid support. Specifications and illustrations of both pieces of apparatus are given in the circulars.

Coke.—Durham Coal & Iron Company, 1117 James Building, Chattanooga, Tenn. Folder. Calls attention to a brand of coke which is noted for its high carbon and low sulphur and ash content. The advantages of using this coke in melting pig iron are given, together with an analysis of the coke.

Automatic Multiple-Spindle Drilling Machine.—Windsor Machine Company, Windsor, Vt. Pamphlet. Deals with an automatic multiple-spindle drilling machine which in reality is a vertical turret machine for drilling, reaming, counterboring and facing parts. The special feature of the machine is that the spindles can be adjusted both radially and circumferentially. A general description of the machine, which can be supplied with from five to nine spindles, is given, the text being supplemented by a number of halftone engravings. Some of the company's single and multiple spindle automatic machines for making duplicate parts from bar stock are also illustrated. An illustrated description of the drilling machine appeared in *The Iron Age*, February 26, 1914.

